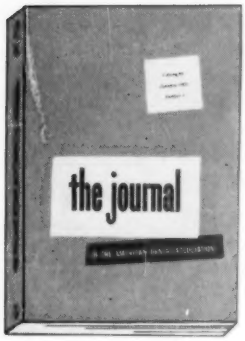
Volume 62

January 1961

Number 1

the journal

OF THE AMERICAN DENTAL ASSOCIATION



January 1961 • Vol. 62 • No. 1 • Lon W. Morrey, D.D.S., Editor

in this issue

Higher fidelity in intraoral roentgenography—Updegrave..... 1
Adaptation of restorations—Phillips-Gilmore-Swartz-Schenker.... 9
Bruxism, a clinical and electromyographic study—Ramfjord..... 21
Second revision of A.D.A. Specification No. 4—Stanford-Weigel-Paffenbarger 45
Psychological study of hypnosis in dentistry—Borland-Epstein.... 54
Financing dental education—Mann-Peterson-Miller..... 65
Income taxes—deduction of education expenses—Christensen.... 77
Editorials 79
International dentistry 83
News of dentistry..... 89
State society presidents.....104
Reports of councils and bureaus.....106
Book reviews 134
Deaths 136
Directory and announcements.....138
Index to advertisements.....224

in the next issue

Intramural (private) practice—Brauer
Retention, resistance and esthetics of the anterior three-quarter crown—Cowger
Dental care coverage administered by an insurance company: a symposium

in future issues look for

Senior student issue. Twelve timely articles on various aspects of dental practice
Eleventh National Dental Health Conference papers

The Journal of the American Dental Association is published monthly by the American Dental Association at 222 E. Superior St., Chicago 11, Ill. Printed in U.S.A. Second class mail privileges authorized at Chicago, Ill. Subscription $7.00 a year in U.S.A.; $8.00 foreign. Issue of January, 1961, Vol. 62, No. 1. Copyright 1961 by the American Dental Association.

The Little Professor Says...

"High Yield Strength and Low Modulus of Elasticity are essential to Greater Resiliency in a Dental Gold Alloy"

JELENKO

FIRMILAY®

is Better because it is more resilient!

As a result of the new, improved physical properties for all Jelenko Casting Golds, Firmilay has greater *Yield Strength* with resulting improvements in resiliency. Add to this its greater toughness, casting qualities and perfect color and you have the most important reasons why Firmilay is your best choice for inlays, crowns and fixed bridgework.

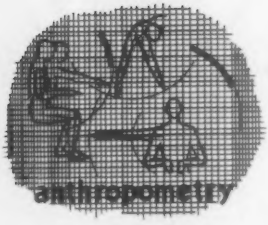
Write for your new physical property chart today.

Popularly priced at $2.25 per Dwt.

A.D.A. Type C Hard

J. F. JELENKO & CO., INC.

138 WEST 52nd STREET, NEW YORK 19, U.S.A.



DOCTOR,
the real
lowdown
on the low
lower
lowest

New Weber
POWERCHAIR

1. Power-Driven Back

As convenient as power steering. With a touch of the foot, a lever places the patient where you want him smoothly, without effort.

2. Toe Board

Designed to appease apprehension – gently moves outward as pressure is directed against it. Eliminates that "trapped" feeling.

3. Controls

No matter where you operate, standing, sitting, front, back, right, left, all controls assure you minimum motion.

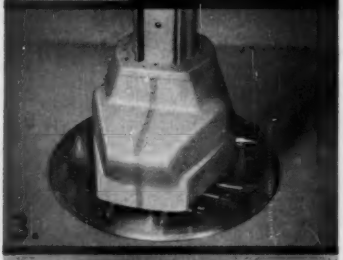
4. Contoured Arms

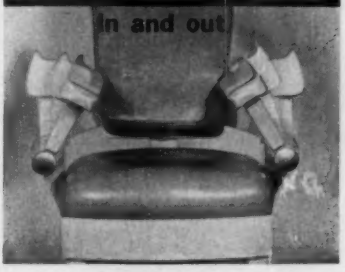
Up and down – arms automatically adjust to patient position.

In and out – Fingertip release permits arms to rotate in or out, or to a "drop" position, to fit narrow, broad, average or small patients.

Compare the low position of the new Weber Powerchair with other makes – See the difference. Weber has the lowest silhouette by far. The difference shows up in the actual measurements in each case from the floor to the chair seat. Check for yourself.

The WEBER DENTAL Manufacturing Company
Canton 5, Ohio





CREST is the first and only dentifrice recognized by the American Dental Association as effective against caries.

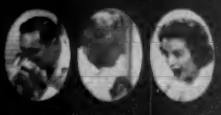
It can be a valuable supplement to your program of regular, preventive care.

Won't you suggest CREST to every patient who can benefit from this added protection?

THE COUNCIL ON DENTAL THERAPEUTICS RESOLUTION:

"Crest has been shown to be an effective anticaries dentifrice that can be of significant value when used in a conscientiously applied program of oral hygiene and regular professional care. Crest dentifrice may also be of value as a supplement to public dental health procedures."

J.A.D.A. 61:272 (1960)



Fluoristan is Procter & Gamble's registered trademark for an exclusive combination of stannous fluoride and a fluoride-compatible polishing agent.

PROCTER & GAMBLE • DIVISION OF DENTAL RESEARCH • CINCINNATI 1, OHIO

Mr. Wiggly is getting around! Originally designed for display purposes, this lively, colorful, 5-inch doll is now in great demand by dentists for their offices, homes, friends and children. We ordered a limited supply which will be available thru dealers while they last, in handy mailing tubes, at $1.00 each.

There is NOTHING like the Wig-l-bug for producing smooth, fine-textured mixtures of your favorite alloy

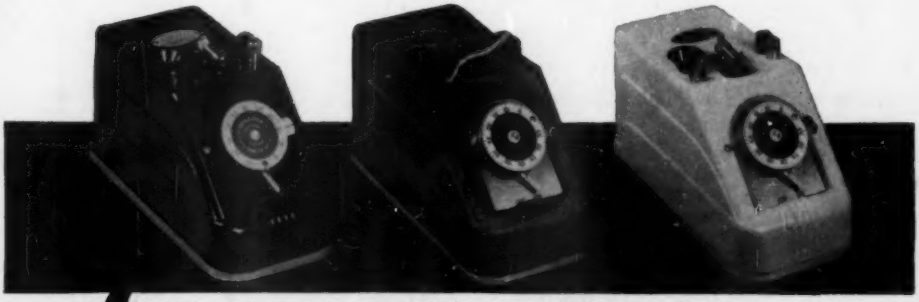
Use the Wig-l-bug with your preferred amalgam alloy in any form: filings or pellets.

Available in Biscayne Blue, Jade Green, Washington Coral (Plain, Standard, complete outfits), $65.50.

Jade Green Mottled, Biscayne Blue Mottled (Unbreakable, complete outfits), $70.50.

Ivory White, $60.50. Pure White (for limited time only), $60.50. Beautiful Black, $55.50.

If you are not experiencing the pleasure of using a Wig-l-bug in your office you owe it to yourself, and to your patients, to order one **now.** Don't take our word for the Wig-l-bug's many advantages — nor your dealer's...ask the dentist down the hall, on the next floor, or on the next street. Get the facts from a fellow dentist. Thousands of Wig-l-bug owners will gladly tell you how much finer their amalgam fillings are . . . how mixes are uniformly better . . . how much time they save. Dentists in private practice, in colleges, clinics and the army and navy recommend the dependability of the Wig-l-bug, its convenience and its real worth.



For complete details see your dealer or write today.

CRESCENT DENTAL MFG. CO.
1839 South Pulaski Road, Chicago 23, Illinois

penalty of leadership?

Those of us who are dedicated to quality in supplying your profession, Doctor, more frequently reap the reward than suffer the penalty of leadership. We have found it so—for dentistry's professional eye can well distinguish between the original and the imitation, the esthetic and the pseudo-esthetic, the mechanical and the dentogenic. Because of this, dentistry's judgment will unerringly select Swissedent CR vacuum-fired teeth over any product of lesser merit.

Swissedent

Swissedent CR vacuum-fired teeth are available through leading dental laboratories everywhere.

Ask your nearest Swissedent distributor:

373 North Western Ave., Los Angeles 4, Calif. / 185 North Wabash Ave., Chicago 1, Ill. / 480 Lexington Ave., New York 17, N.Y.

RINN X-RAY FILM—How can its crystal-clarity best be described? . . . a waterfall, a snow-capped skyline, the morning freshness of a mountain lake? It's all of these. For here is the film which bespeaks the ultimate in Roentgenography. There are seven sizes from which to choose—three of which are periapical—No. 0 (Pedodontal), No. 1 (Narrow) and No. 2 (Standard); and four of which are fixed tab posterior bite wings—No. 0, No. 1, No. 2 and No. 3 (Long). Speeds? There are three—Regular, Medium Fast and Extra Fast—. And all speeds and sizes have Matte finish—familiarly known to Rinn users as the film with the 'built-in view box' because it provides the necessary translucency while eliminating transparency. Films are double coated with Tropical Emulsion and have a true-blue base. For further information see your dealer or write Rinn Corporation, 2929 North Crawford Avenue, Chicago 41, Illinois. Catalog of the complete Rinn line is available upon request.

Rinn

LEADERS IN THE DEVELOPMENT OF DENTAL X-RAY TECHNIQUES AND PRODUCTS

'ROUND THE WORLD ON A FREIGHTER

How to plan now... and go later

You can have a wonderful retirement if you start planning now with an *insured* Personal Pension Plan.

An Insured Personal Pension Plan is the ideal way to *guarantee yourself* a flexible retirement income . . . and a Company like Great-West Life has a variety of policies designed especially to meet the financial needs of professional men. You can retire at 55, 60, 70 ... any age you wish ... your plan can then provide all the *guaranteed* income you need.

An Insured Pension Plan will provide life insurance also—adding family protection to your own retirement income benefits ... it ensures all-round protection for you and your family.

Discuss this important subject with your life insurance man at an early date.

THE
GREAT-WEST LIFE
ASSURANCE COMPANY
HEAD OFFICE - WINNIPEG, CANADA

Underwriters of the A.D.A. group life insurance plan.

PICTURE BOOK PREPARATIONS

but will your filling material do them justice?

they'll look right — and last — when you use

ACHATITE

reinforced silicate filling material

You get the lifelike look of natural teeth . . . plus strength that resists breakage — even on corners and incisal edges . . . exceptional resistance to stain, discoloration, washout . . . and real packing ease.

ACHATITE picks up shades of adjacent tooth structure to make shade blending simpler than ever before.

SATISFACTION GUARANTEED

Order through your ACHATITE dealer today or write for detailed literature

ACHATITE is on the list of Certified Dental Materials

VIVADENT CORP.
30 PINE STREET, WOBURN, MASS.

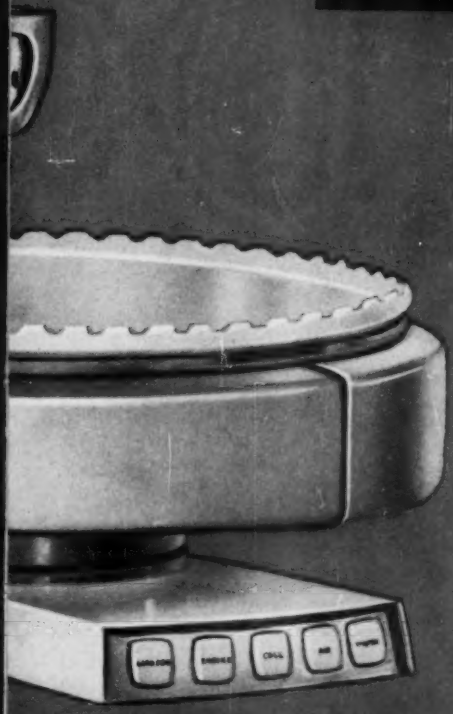
everything convenient...instruments
This assembly includes a new type of motorized pulp tester with fingertip control, new X-ray illuminator enabling you to refer to the image as you work . . . and spray bottle heater with automatic temperature control.
Sliding door conceals instruments from patients. At your option, the accessory table may include air cutoff, warm water syringe, warm air syringe and mouth lamp with mirror or cautery. No back pull on instrument cords. Easily retractable.
S. S. WHITE PRODUCTS GIVE YOU HIGHEST VALUE FOR YOU

S. S. WHITE DENTAL UNITS

concealed

Selectron

MODELS



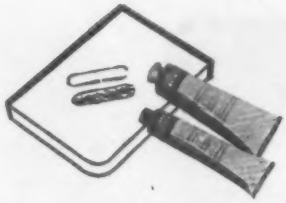
Simplicity of form and function characterizes the Selectron . . . dentistry's newest concept in operating ease and convenience. Automatic controls are at your fingertips. Instruments are concealed, yet always easily accessible from any position. Water and electrical systems are separate for assured safety . . . and each Selectron model is designed to accommodate extras when necessary. Ask your dealer about the automatic, streamlined Selectron . . . or write direct.

On dual arm models, the conventional handpiece or the Airotor can be put into immediate use by pushing a button. Air, water or spray for the conventional handpiece can be similarly selected. Buttons light up when activated and the light on the Airotor button blinks, indicating drip rate of the lubricating oil.

THE S. S. WHITE DENTAL MFG. CO.
Philadelphia 5, Pa.

DOLLAR. WITH THE BEST IN QUALITY FOR YOUR PRACTICE.

The tubes you love to s-q-ueeze



COE-Flex the outstanding all-purpose rubber impression material, *is popular with everybody.* With dentists because it possesses an accuracy and dimensional stability unequalled today. It is easy to use (mixes easily, speeds up impression taking, conserves chair-time); safe to use (pouring can be delayed). With patients because it makes impression taking more pleasant. With technicians because it assures better fitting cases, avoids make-overs . . .

COE-Flex is available in the viscosity you prefer . . . Coe-Flex REGULAR for the average mix. Coe-Flex HEAVY for the most viscous mix. And Coe-Flex INJECTION TYPE for a fluid mix. Used with the Coe-Flex Syringe, this type is recommended for impressions for single or multiple cavities. Only $5.50 per pkg.

Order from your dealer

COE Laboratories, Inc. Chicago 21, Illinois

Py·co·pay TOOTHBRUSH...

THE PROFESSION'S CHOICE

to promote more effective brushing and better oral health:

- **SMALL, NARROW HEAD** provides accessibility to all posterior lingual areas.
- **UNIFORMLY TRIMMED BRISTLES** assure gentle and effective cleansing.
- **STRAIGHT, RIGID HANDLE** permits adequate control for correct brushing and gingival hygiene.
- **PY-CO-TIP RUBBER CONE** supplies optimum flexibility for interdental cleansing.

Py-co-pay is available in a wide range of textures to fit every individual need—medium, hard and extra hard nylon; "Softex" multi-tufted nylon; hard and extra hard in first cut Chungking natural bristle (all natural bristle brushes are "Duratized" for longer wear). All brushes are "Steratized" to sanitize the brush.

BLOCK DRUG COMPANY, INC.

"Quality Products for Dental Health"

Py·co·pay recommended by more dentists than any other toothbrush.

Vivacious smile on tour

This young immediate denture patient is appearing in person at the Trubyte Exhibit at major dental meetings throughout the country.

Her smile is often described as "vivacious" . . . and with good reason! Trubyte Bioblend teeth, when seen in the mouth, are full of life, and their color appears completely natural because Bioblend's variegated colors are achieved, as in Nature, *from the inside out.* Have you seen what these lively, multiblended teeth can do for *your* denture patients? Ask your Trubyte Dealers' Representative for a demonstration today.

TRUBYTE® Bioblend

MULTI-BLENDED VACUUM FIRED PORCELAIN ANTERIORS

Made in America by The Dentists' Supply Company of New York · York, Pa.

The world's largest manufacturer of fine artificial tooth products.

the Journal
of the
American Dental
Association

Higher fidelity in intraoral roentgenography

W. J. Updegrave, D.D.S., Philadelphia*

Although the bisecting-angle technic of oral roentgenography is still being widely used and taught, it results in dimensional distortion, unnecessary superimposition of the parts, and lack of intimate detail. Distortion is minimized when the paralleling technic is used. Instruments are available to facilitate the parallel placement and retention of the film packet, and to indicate the correct angulation of the x-ray beam.

Complacency is the greatest enemy of progress. This is exemplified in the general practice of oral roentgenography in which the same basic intraoral technic, advocated when it was first introduced to the dental profession, is still being widely used and taught today, notwithstanding its shortcomings and inaccuracies. It is popularly known as the bisecting-angle technic.

Most dentists have become so accustomed to examining roentgenograms produced by this technic that they accept them and make allowances for their shortcomings. Inaccurate portrayal of the anatomic relationship of the structures, unnecessary superimposition of the parts, and over-all lack of intimate detail, so important for accurate interpretation, are inadequacies commonly seen in bisecting-angle roentgenograms. There is no necessity, however, to use this technic since there is one which overcomes these deficiencies, is simpler to perform, produces standardized results and can be reliably duplicated. This is known as the paralleling technic.

The bisecting-angle technic derives its name from the method followed for determining the vertical angulation for projection of the x-ray beam. It is based on the geometric principle of directing the rays perpendicular to an imaginary plane which bisects the angle formed by the long axis of the tooth and the plane of the film packet (Fig. 1, left). This procedure

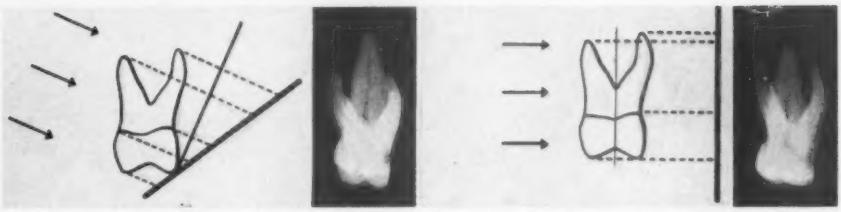


Fig. 1 • Left: Diagram showing bisecting-angle technic with resultant roentgenogram. Right: Diagram showing paralleling technic with resultant roentgenogram. (Illustrations courtesy of C. V. Mosby Company)

must be precise, otherwise the roentgenographic images will appear elongated or foreshortened.

Although the principle on which this technic is based is relatively simple, its practical application relies largely on guesswork and the experience of the operator. How can a high degree of accuracy be accomplished when the tube is angulated to project the rays perpendicular (Guess 1) to an imaginary plane (Guess 2) which bisects the long axes of the teeth, only the crowns of which can be seen (Guess 3), and the plane of the film, only the edge of which can be seen when in position (Guess 4)?

However, assuming that the operator is sufficiently experienced and, with the aid of recommended approximate angulations, does produce as accurate roentgenograms as possible with the bisecting-angle technic, a form of distortion is still present, whether recognized or not. This is known as dimensional distortion and is the result of using the bisecting-angle method to project three-dimensional objects (dento-alveolar structures) onto a two-dimensional surface (film). Such projection can never be accomplished without distortion since the parts of the object(s) farther from the film will be projected in an incorrect relationship to those close to the film and will not represent accurately the object(s) (Fig. 2, top row). Such dimensional distortion can be minimized by positioning the film parallel to the object and then directing the rays at right angles to the film (Fig. 1, right). In this technic, three-dimensional objects are projected with all parts in their correct relationship (Fig. 2, bottom row). A more detailed description appears elsewhere.[1, 2]

When such a parallel relationship is attempted in intraoral roentgenography, a distance usually is created between the film and the teeth because of local anatomic characteristics, especially in the maxilla. Since image enlargement results as the object-film distance is increased, it becomes necessary to increase the focal-film distance to control this enlargement (Fig. 3). It will be noted that the greatest reduction in enlargement occurs when the focal-film distance is increased from 8 inches (short cone) to 16 inches. Beyond this, the reduction in enlargement becomes much less, whereas the difficulties of positioning the head of the unit become greater. Therefore, a 16 inch focal-film distance is recommended for general use because of its adequacy and adaptability. However, if the local conditions warrant use of a greater distance, such a procedure, then, may prove to be beneficial.

PRACTICAL APPLICATION

The two major problems encountered when applying the paralleling, extended-distance method to intraoral roentgenography are (1) positioning and retaining the film parallel to the long axes of the

teeth, and (2) projecting the rays perpendicular to the film.

A pair of plastic holders with indicator rods, designed for positioning the film as parallel to the teeth as the anatomy will permit and at the same time indicating the correct alignment of the extension tube in both horizontal and vertical planes, greatly simplify the procedure and solve the two major problems (Fig. 4). A more detailed description of the positioning instruments has been presented elsewhere.[2]

Positioning of Film • Difficulty in attaining absolute parallelism of the film packet with the teeth in more than 50 per cent of the patients and frequent failure of the roentgenograms to portray adequately the periapical regions are further objections to using the paralleling technic. These difficulties arise, for the most part, in roentgenography of maxillary teeth, where anatomic limitations of low and constricted vaults make absolute parallelism with adequate periapical coverage difficult and sometimes impossible. Barr and Grøn[3] have studied this problem and found that when parallel film placement fails to produce adequate periapical coverage, the indicated procedure is to allow the film packet to diverge from the teeth. They state, "Provided that the film-to-tooth angle was within 20 degrees, the image was found somewhat surprisingly, to be superior in terms of dimensional accuracy." The objective in film placement, therefore, is to position the film as nearly parallel to the long axes of the teeth as the anatomy will permit, not exceeding a 20 degree divergence. Since the long axes of posterior teeth are usually at right angles to their occlusal surfaces, the broad biting area of the film positioner resting flat across the occlusal surfaces, automatically positions the film packet parallel to their long axes (Fig. 4). The long axes of the anterior teeth can be determined clinically with little difficulty and the packet positioned accordingly.

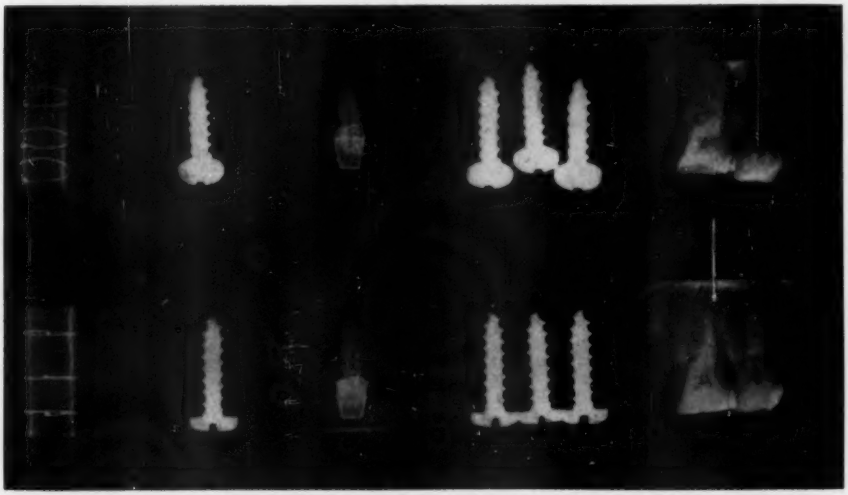


Fig. 2 • Top row: Roentgenograms demonstrating dimensional distortion resulting from bisecting-angle technic. Bottom row: Roentgenograms free from dimensional distortion when paralleling technic is used. (Identical objects in both series)

Frequently the block will not rest perfectly flat across the occlusal surfaces of the maxillary posterior teeth because of limited palate height (Fig. 5, above left). If the tooth-film divergence does not exceed 20 degrees, the results will be satisfactory (Fig. 5, below left). Furthermore, if the teeth are short and the palate shallow, the insertion of a cotton roll between the block and the teeth being examined will create a more parallel relationship and usually will display adequate periapical coverage (Fig. 5, above right and below).

Positioning of Extension Cone • Another problem frequently encountered when converting from the short to the extended target-film distance is limited maneuverability of the unit. Unless the roentgenographic unit has been located in a relation to the dental chair specifically for use with the 16 inch or greater focal-film distance technic, it is impossible to maintain the patient's head in the accepted dental roentgenographic position and correctly adjust the extension tube for certain areas because of mechanical limitations of the unit.

Since the paralleling instruments eliminate the necessity for maintaining a specific head position of the patient to determine angulation, the problem of extension cone alignment usually can be solved by rotating the chair to greatest advantage and then adjusting the patient's head to the extension tube (Fig. 6). As long as the indicator rod of the instrument is properly aligned with the extension tube of the unit, the position of the patient's head and the angulation used is irrelevant. This procedure often makes possible the adoption of the paralleling technic without changing the roentgenographic unit from its original location occupied for use with the short-cone bisecting-angle technic.

Another technical advantage of the paralleling technic is the latitude in vertical angulation made possible because of

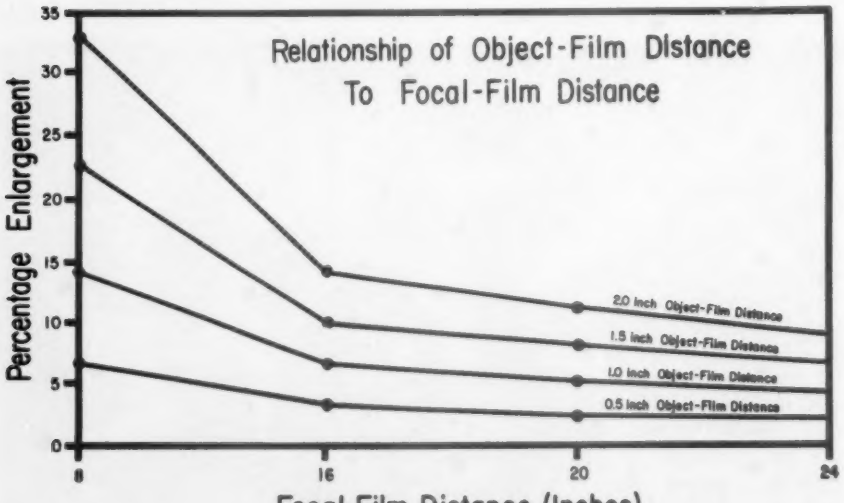
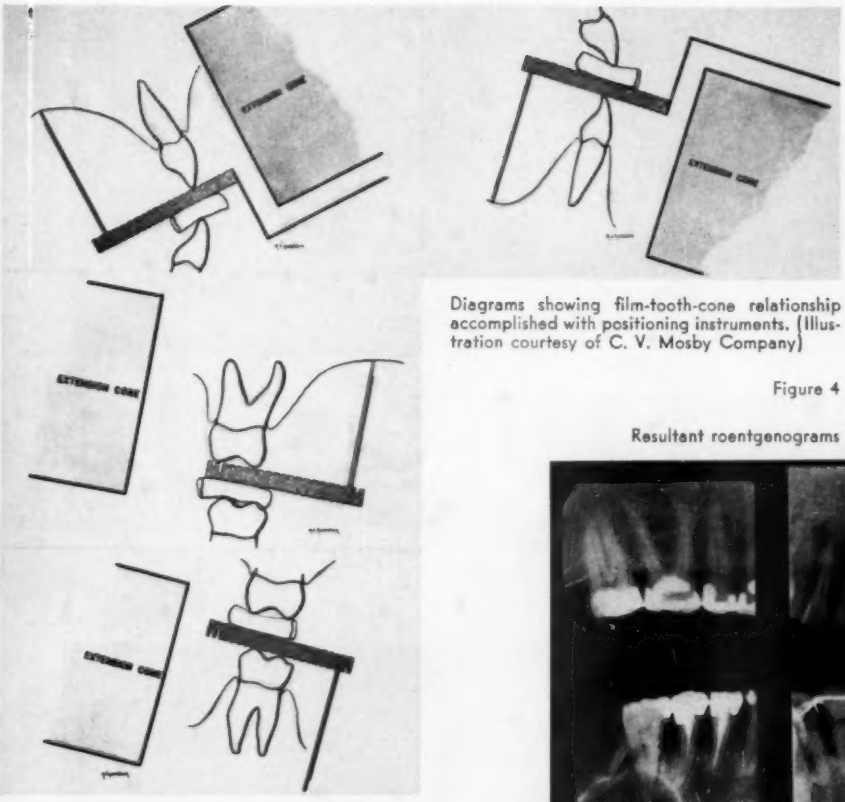


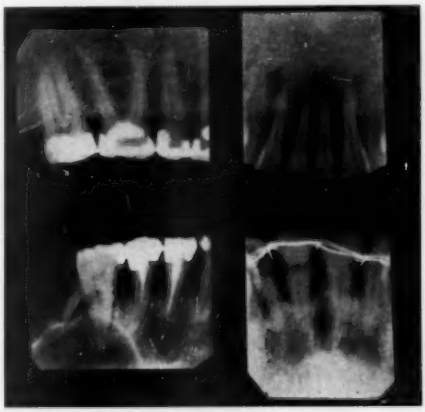
Fig. 3 • Relation of object-film distance to focal-film distance, showing necessity for increasing focal-film distance to control enlargement when object-film distance is increased. (Illustration courtesy of C. V. Mosby Company)



Diagrams showing film-tooth-cone relationship accomplished with positioning instruments. (Illustration courtesy of C. V. Mosby Company)

Figure 4

Resultant roentgenograms

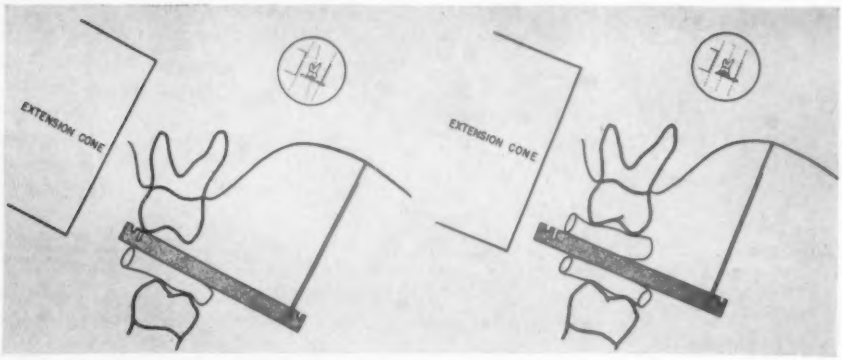


the parallel relationship between the teeth and the film packet. The effect of altering the vertical angulation in the bisecting-angle and paralleling technics is shown in Figure 7. The resultant roentgenograms demonstrate that the margin for error in vertical angulation is considerably greater with the latter.

To check the accuracy of the roentgenographic image produced with the paralleling technic, comparison was made between extracted teeth and the films (Fig. 8). Duplicate films taken in the interim prior to the extractions exhibited the same accuracy as the original films.

Correct diagnosis in periodontal disease is dependent on the accurate portrayal of the height and relationship of the buccal and lingual alveolar bone. Comparison between the two technics in projection of the alveolar crests further emphasizes the value of the parallel relationship in producing roentgenograms displaying minimum distortion (Fig. 9). Bitewing films are a supplement to, but not a substitute for, periapical parallel technic films in periodontal disease.

Since accurate image production is the goal of everyone doing dental roentgenography, the paralleling-extended dis-



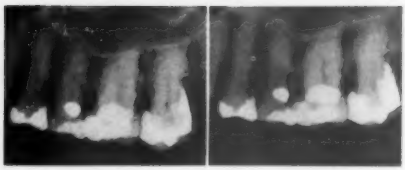


Fig. 5 • Above left: Low palatal vault preventing absolute parallel tooth-film relationship. Above right: Parallel relationship established by inserting cotton roll between holder and occlusal surface of tooth. Below: Resultant roentgenograms of each procedure

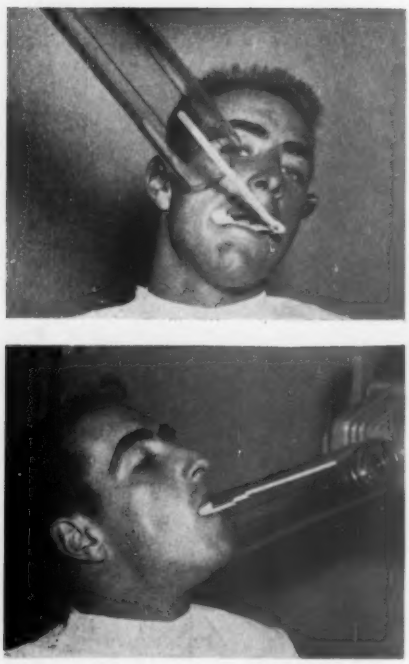


Fig. 6 • Positioning instruments eliminate standard head position and specific angulation. Maxillary posterior region (above left), maxillary incisor region (above right) and mandibular posterior region (below left)

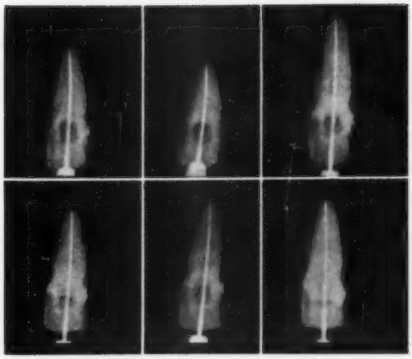


Fig. 7 • Effect of changes in vertical angulation. Top row: Bisecting-angle technic. Left, beam directed perpendicular to bisecting plane. Center, increase of 20 degrees in vertical angulation (foreshortening). Right, decrease of 20 degrees in vertical angulation (elongation). Bottom row: Paralleling technic. Left, beam directed perpendicular to film. Center, increase of 20 degrees in vertical angulation. Right, decrease of 20 degrees in vertical angulation.

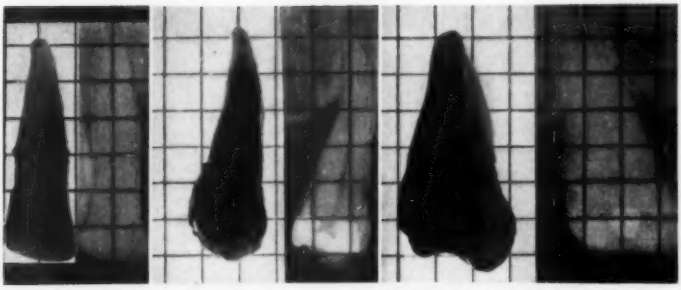


Fig. 8 • Views comparing tooth size with roentgenographic image to test accuracy of paralleling technic

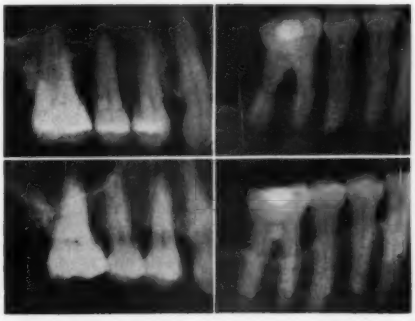


Fig. 9 • Above: Roentgenograms taken with bisecting-angle technic. Below: Roentgenograms taken with paralleling technic. Note difference in crestal bone projection

tance procedure should be the technic of choice. The objections of inability to obtain a parallel relationship because of anatomic limitations, the reduction of periapical area coverage, the difficulty of placement and retention of the film, the risk of movement, the demand for dexterity and more cooperation from the patient, the lack of rigidity of the film packet, the increased object-film distance, the difficulty in positioning the extension cone, the inability to duplicate films accurately and correct errors, and the additional effort required to produce parallel technic roentgenograms have been answered in this article. The paralleling, angle-indicating set of instruments offers a practical solution for accomplishing higher fidelity in intraoral roentgenography.

SUMMARY AND CONCLUSIONS

Dimensional distortion is a direct product of the bisecting-angle short-distance technic in intraoral roentgenography. Such distortion is minimized when the paralleling extended-distance technic is used.

Instruments which facilitate the parallel placement and retention of the film packet and, at the same time, indicate the correct angulation of the x-ray beam both horizontally and vertically, greatly simplify the procedure.

Comparison of films taken with the bisecting-angle technic and those taken with the paralleling technic herein described, demonstrates the limitations of the former and the anatomic fidelity of the latter.

Progress in intraoral roentgenography demands the adoption of a simplified, standardized technic which is readily accomplished, can be reliably duplicated and produces anatomically accurate roentgenographic images.

*Professor of radiodontics, Temple University School of Dentistry.

1. Updegrave, W. J. Paralleling extension-cone technique in intraoral dental radiography. Oral Surg., Oral Med. & Oral Path. 4:1250 Oct. 1951.

2. Updegrave, W. J. Simplifying and improving intraoral dental roentgenography. Oral Surg., Oral Med. & Oral Path. 12:704 June 1959.

3. Børr, J. H., and Grøn, Poul. Palate contour as a limiting factor in intraoral x-ray technique. Oral Surg., Oral Med. & Oral Path. 12:459 April 1959.

Scientific Process • The development of science is a control and communication process for the long-term understanding and control of matter. In this process 50 years are as a day in the life of the individual. For this reason, the individual scientist must work as a part of a process whose time scale is so long that he himself can only contemplate a very limited sector of it. . . . Even when the individual believes that science contributes to the human ends which he has at heart, his belief needs a continual scanning and re-evaluation which is only partly possible. For the individual scientist, even the partial appraisal of this liaison between the man and the process requires an imaginative forward glance at history which is difficult, exacting, and only limitedly achievable. And if we adhere simply to the creed of the scientist, that an incomplete knowledge of the world and of ourselves is better than no knowledge, we can still by no means always justify the naive assumption that the faster we rush ahead to employ the new powers for action which are opened up to us, the better it will be. We must always exert the full strength of our imagination to examine where the full use of our new modalities may lead us. *Some Moral and Technical Consequences of Automation. Norbert Wiener. Science 131:1358 May 6, 1960.*

Adaptation of restorations in vivo as assessed by Ca^{45}

Ralph W. Phillips, M.S.; H. William Gilmore, D.D.S.; Marjorie L. Swartz, M.S., and Saul I. Schenker, D.D.S., M.S.D., Indianapolis

This is a preliminary radioautographic study of the marginal adaptation of some of the common restorative materials after varying periods of service in teeth in the mouths of humans and dogs. Initially, the margins of amalgam restorations were penetrated readily by the isotope, but leakage appeared to diminish as the restoration aged. Some leakage was observed with zinc phosphate cement, but there appeared to be less infiltration around older restorations. The behavior of silicate restorations was variable. The resin materials effected a relatively good seal of the cavity during the observation period. The results are preliminary and the data are incomplete.

Close adaptation of restorative materials to the cavity walls to prevent the ingress of saliva and other debris has long been considered mandatory for any good dental restoration.[1] The ideal material would be one which would bond chemically with the tooth structure. None of the present materials possesses this quality. Furthermore, many of the physical properties, such as dimensional change and solubility, could increase the possibility of marginal leakage. Manipulative technics have been developed and continually modified in the hope of minimizing or compensating for the shortcomings of the different restorative materials, and a considerable amount of research has been devoted to investigating the effectiveness of these various procedures in improving the marginal seal of different materials.

A number of technics have been employed to measure adaptation. The methods have included marginal penetration by dyes,[1-4] bacteria[5-7] and radioisotopes.[8-11] The amount of tensile stress required to break cement bonds has been measured,[6,12] and the adaptation of materials placed in teeth, plastic and metal molds has been assessed both visually and microscopically.[13-15] Other workers have utilized resistance to air pressure[16] and the extrusion of moisture at the margins of fillings during temperature change.[17] The results of these studies are somewhat conflicting. Much of this disagreement stems from differences in technics, such as substitution of glass or metals for natural teeth, failure to seal roots to prevent the ingress of penetrants by way of the

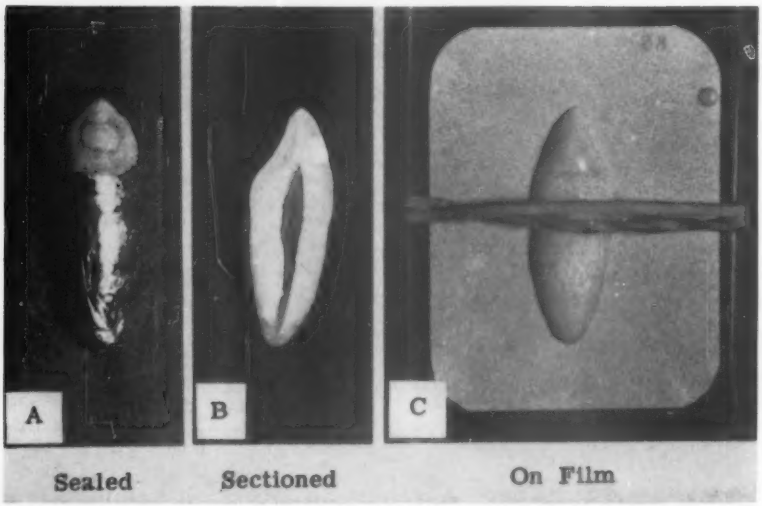


Fig. 1 • Steps in preparation of teeth. A. Sealed tooth. B. Sectioned tooth. C. Tooth mounted on x-ray film

root canal, and variation in the elapsed time between placement of restorations and subsequent testing.

All of these previous studies have been concerned primarily with the in vitro restoration and little information is available concerning the adaptation of the in vivo restoration. Thus the purpose of this study was to measure the marginal adaptation of restorations after varying periods of time in the oral cavity.

PROCEDURE

This study was divided into two sections. In the first portion various types of restorations were placed in the teeth of dogs whereas the second phase made use of clinical restorations placed in humans. The adaptation of these restorations was evaluated on the basis of penetration of a radioactive isotope at the margins as demonstrated by radioautographs. This particular method of measuring adaptation was chosen since it seemed to offer certain advantages over some of the other technics. The technic permits greater versatility; for example, it permits the use of compounds of varying molecular size and charge. Also it provides a convenient means of recording data permanently for future reference.

Restorations were placed in the canines, lower second molars and, when size permitted, the upper precanines of the dogs. Conventional rotary dental instruments were used to prepare the cavities, and the rubber dam was used during placement of all restorations. After insertion of the restorations, the dogs were sacrificed at intervals of 48 hours, 30 days, 60 days and 6 months.

In the clinical study, anterior teeth generally were used. Class V restorations were placed in the middle third of the labial surfaces. Whenever bicuspids or molars were used, occlusal restorations were always employed. The teeth were extracted at the end of 1 week, 1 month and 3 months.

In both portions of the investigation, the teeth were placed in tap water im-

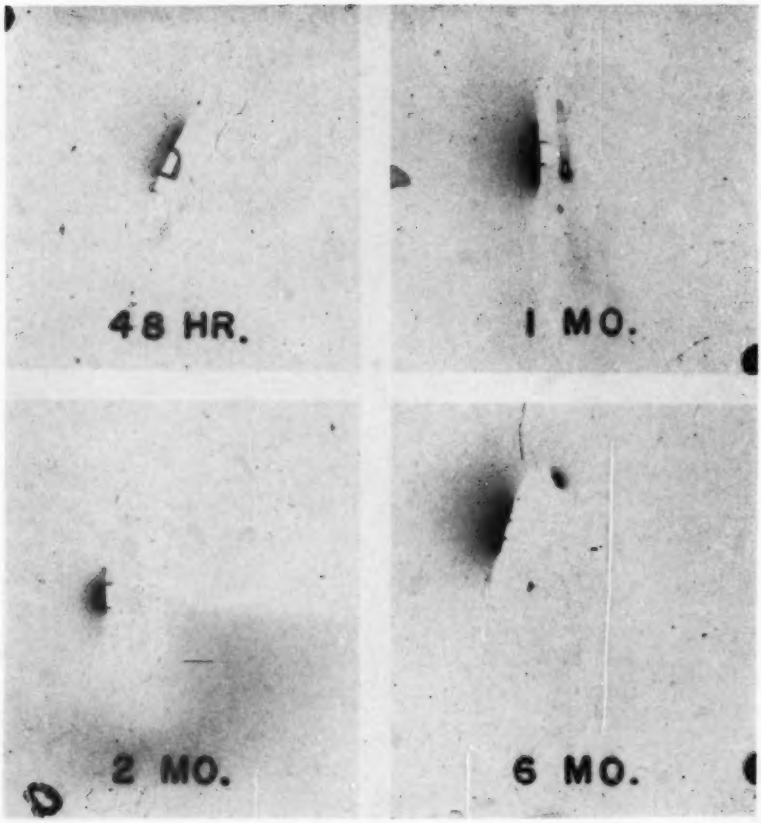


Fig. 2 • Amalgam restorations which were placed in dogs' teeth and tested after the specified times

mediately after extraction and the isotope test performed within 24 hours.

The restorative materials used in the experiment thus far have been amalgam, silicate cement, zinc phosphate cement and resin. The manipulation of all materials was carefully standardized in accordance with accepted dental procedures. Amalgams were placed by the "increasing dryness" technic and were carved but not polished. Some were placed in preparations that had been coated first with a commercial cavity varnish, Copalite. The cements were spatulated on a cool dry slab with particular attention being given to the powder-liquid ratio. Silicate, zinc phosphate cement and resin restorations were not finished until 24 hours after insertion. Silicate fillings were always coated with a protective agent to prevent premature contact with moisture. The resin restorations were placed both with and without the use of their recommended cavity liner.

Ca^{45}, in the form of calcium chloride, was employed as the tracer in these initial studies. The pH of the solution was adjusted to 5.5 and the concentration was

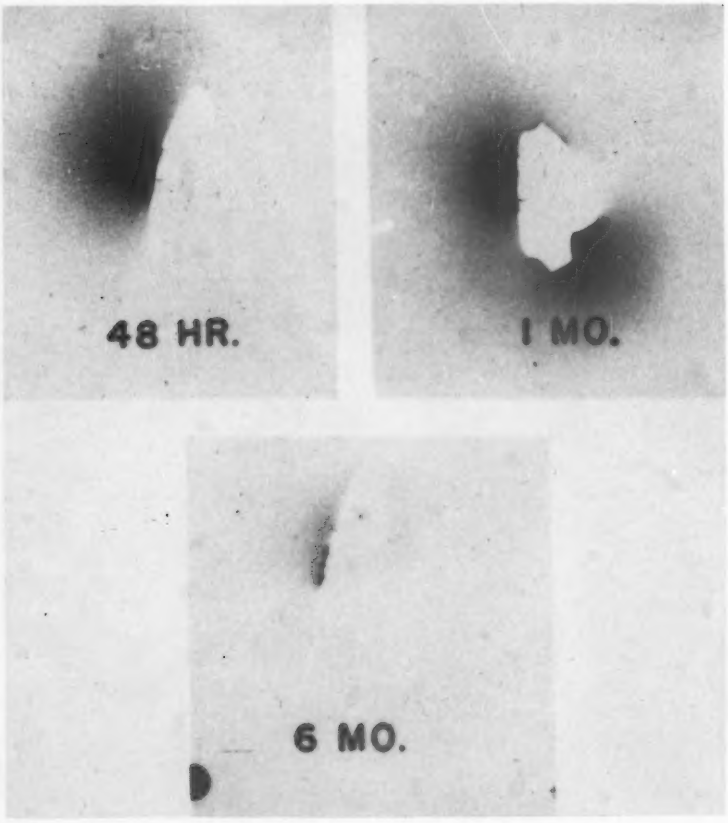


Fig. 3 • Amalgam restorations with a cavity liner in dogs' teeth

0.1 millicurie per milliliter. This isotope has been used to study marginal adaptation by Armstrong and Simon,[8] Sausen and co-workers[9] and Crawford and Larson.[10] With certain alterations the technic utilized here was that described by Crawford. On the basis of preliminary experiments, the following procedure was evolved.

It is highly important that all surfaces of the tooth be sealed completely from the isotope except for the exposed marginal areas of the restoration. This problem must be controlled as leakage through the root canal, a crack or exposed dentin can obliterate the true picture of marginal adaptation. Considerable experimentation led to the following technic. The roots and gingival portion of the crowns of the teeth containing the experimental restoration were first painted with clear nail polish. Where faults in the enamel were observed, the covering was extended to protect these areas. While the nail polish was tacky, tin foil was adapted over the coated portions. A second coat of polish was then carefully applied to seal the edges of the foil. The sealed teeth were immersed in the isotope solution for two hours. This particular

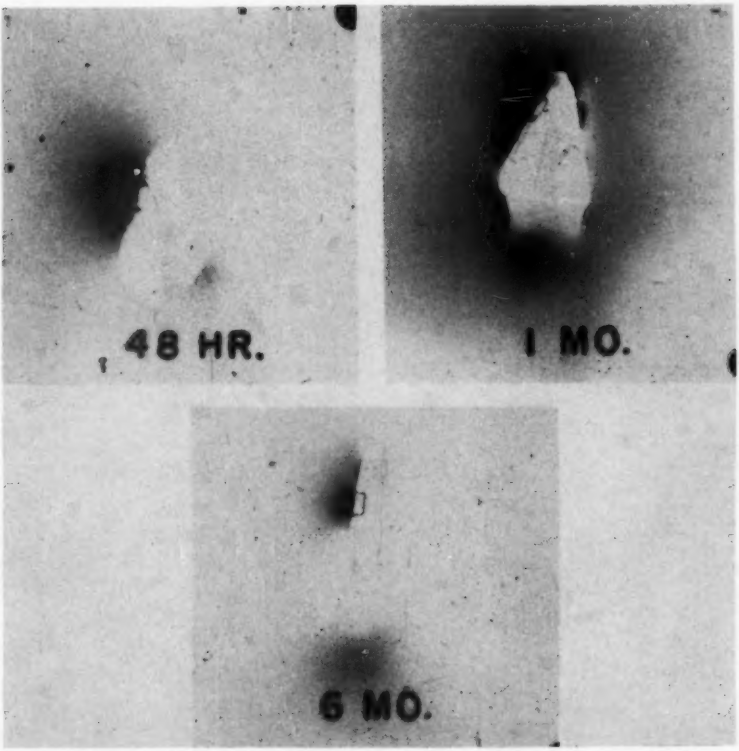


Fig. 4 • Silicate restorations in dogs' teeth

immersion time was selected as previous experiments had indicated more uniform results and sharper radioautographs than when longer immersion times were employed.

On removal from the isotope the teeth were rinsed for one hour in running water, the tin foil stripped away and the surfaces brushed with a detergent and water. Longitudinal sections were then made through the restoration by grinding on a 400 mesh carborundum wheel under water. This wheel was specially fabricated to have a soft matrix so that a superficial layer could be removed easily with a dressing tool after preparation of each specimen. Thus the possibility of carrying contaminated particles from one tooth to the next was minimized. The cut surfaces were always brushed with a detergent solution before the teeth were placed on film.

The tooth in the various stages of preparation is shown in Figure 1. As can be seen, the film was supported by a small piece of plastic and the tooth held in close apposition to the film by means of a rubber band. An ultra-fast dental x-ray film was used for all radioautographs. The teeth were allowed to remain in contact with the films for 17 hours.

The teeth and the radioautographs were examined carefully and compared. If there was any evidence of infiltration

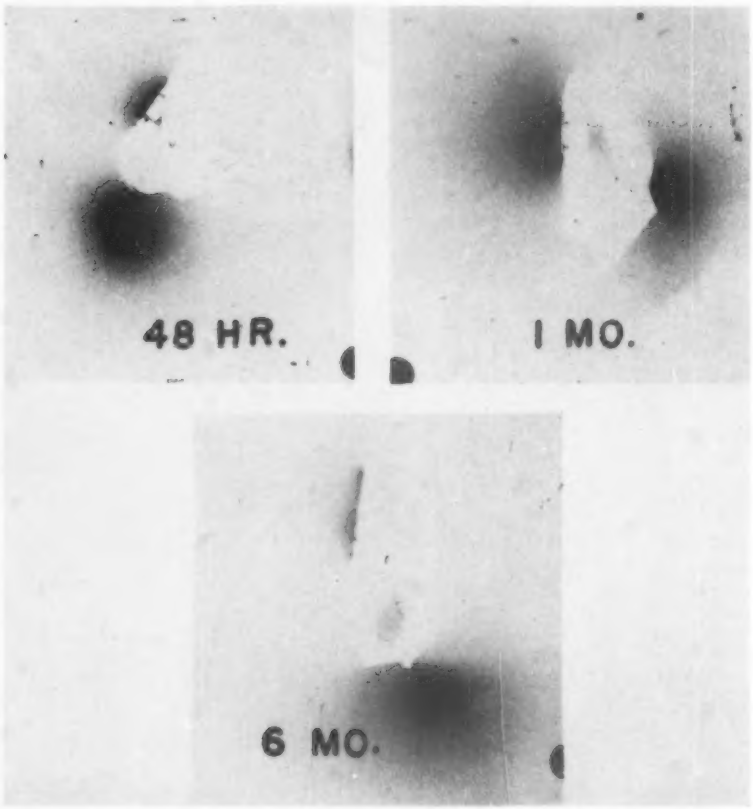


Fig. 5 • Zinc phosphate cement restorations in dogs' teeth

from sources other than the margins of the restorations, the data were discarded.

RESULTS

It must be emphasized that these results are preliminary. There are many inherent variables, such as differences in the individual teeth and the oral environment, and experience with this technic has emphasized the necessity of employing large numbers of specimens. Although the data are incomplete as yet, based on only 220 restorations, it is felt that certain trends are evident and hence these early observations are presented. The radioautographs which are shown were selected as being representative of the data collected to date.

Dog Study • The data shown are the results on 3 to 6 teeth for each material at each time interval.

The radioautographs of amalgam restorations tested at the various time intervals are seen in Figure 2. The isotope, as shown by the dark line, permeated the margins and completely surrounded the 48-hour restorations. The amount of penetration was reduced considerably in

the one-month specimens, but no appreciable difference was observed after an additional 30 days, as illustrated by the two-month restorations. There was, however, a noticeable reduction in the marginal permeability of restorations which had been in place for six months. Radioautographs prepared from these specimens revealed only a slight penetration of the isotope. It should be mentioned that the results obtained with the individual restorations were fairly constant and the finding that leakage decreases with time was consistent. This observation has been implied by the work of Nelsen[17] and by tests conducted in this laboratory on extracted teeth containing old amalgam restorations.

The sealing ability of amalgam (Fig. 3) was definitely improved by use of a cavity varnish, as can be seen with the 48-hour specimen. Little ingress of the isotope was noted at the margins of restorations which had been in the oral cavity for one month. As characteristic of previous results obtained with amalgam, even less infiltration occurred with the six-month restorations.

The greatest variation in individual results was found with the silicate restorations (Fig. 4). In most instances there was gross penetration of Ca^{45} at the marginal regions. As might be expected, the isotope was absorbed by the surface of the material and occasionally the entire body of the restoration was permeated.

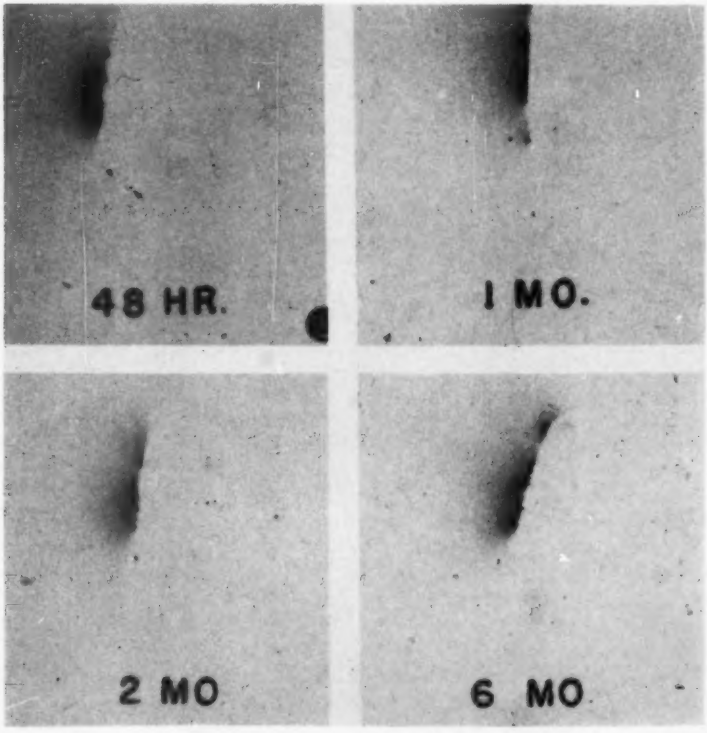


Fig. 6 • Resin restorations in dogs' teeth

The radioautographs of both one-month and six-month silicate restorations were comparable to those obtained at 48 hours. These data indicated no appreciable change in the adaptation of the silicate restorations during the first six months of service.

Zinc phosphate cement restorations exhibited less leakage than silicate fillings at all time intervals (Fig. 5). There was less penetration of the margins of one-month specimens than of 48 hour ones. Surprisingly enough, leakage was further reduced at the six-month period.

The data obtained in tests conducted with a restorative resin, Sevriton, are shown in Figure 6. The recommended cavity sealer was utilized in this series. The results were exceedingly constant with little variation in individual specimens. The degree of leakage was very slight at all time intervals, and the adaptation of six-month specimens was comparable to that of restorations which had remained in the mouth only 48 hours. The omission of the cavity seal recommended by the manufacturer did not impair the adaptation of the material (Fig. 7). Again there was only the most superficial penetration of the margins.

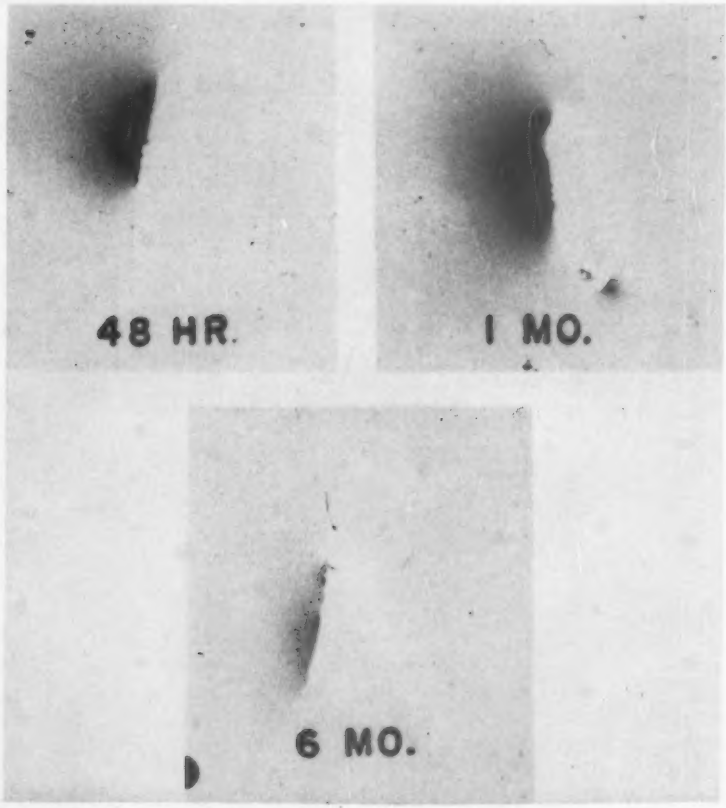


Fig. 7 • Resin restorations with the cavity seal omitted

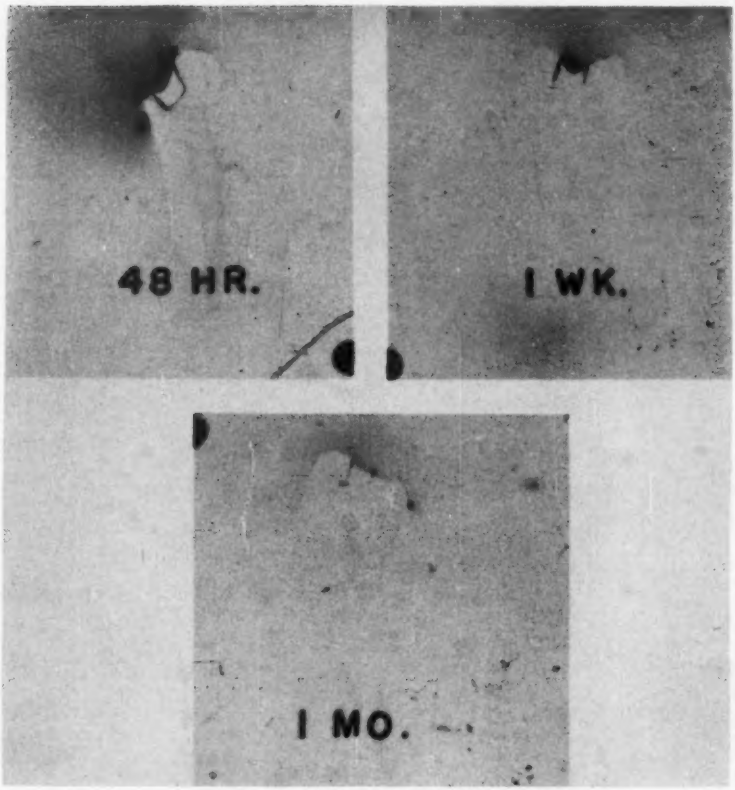


Fig. 8 • Amalgam restorations in clinical patients tested after the specified times

Human Study • Representative radioautographs of amalgam restorations which had remained in the oral cavity for periods of 48 hours, one week and one month appear in Figure 8. The isotope penetrated completely around all of the 48-hour restorations. Adaptation improved at one week with leakage further reduced in specimens that were one month old.

There was considerable uptake of the isotope by the surfaces of the silicate cement restorations and appreciable marginal penetration (Fig. 9). These results compare favorably to those which were obtained with the dogs. Again no change was detected in the general pattern of leakage as related to time. Silicate restorations that were three months old appeared to be as well adapted as one-week specimens.

Some ingress of the isotope did occur at the margins of resin restorations (Fig. 10); however, the magnitude was relatively small. The line of penetration was thin and in almost all instances limited to the marginal regions. There was no change in the adaptation with time. Infiltration of the three-month specimens was generally no greater than in those which had remained in the oral cavity one week.

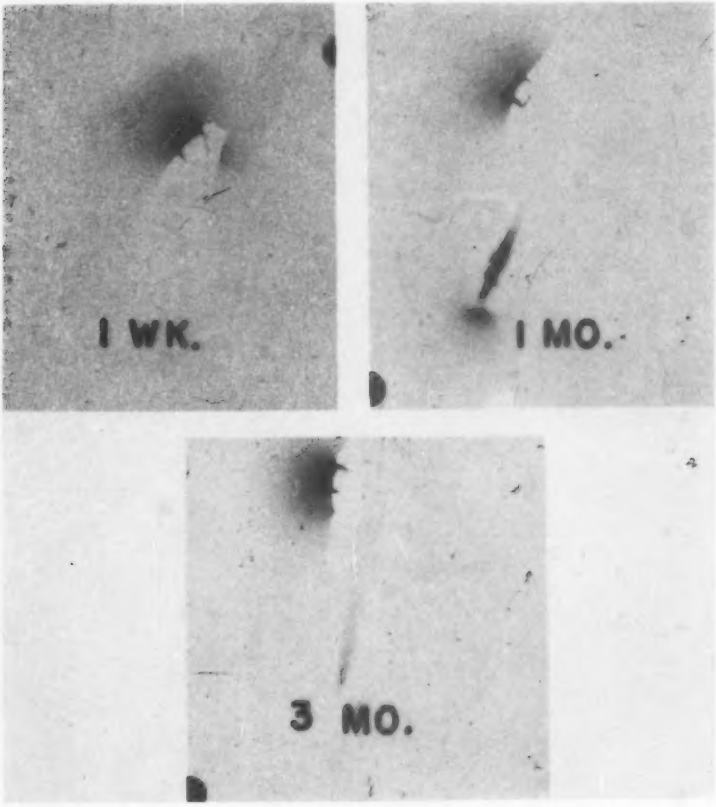


Fig. 9 • Silicate restorations in clinical patients

DISCUSSION

It should be emphasized again that this report is of a preliminary nature and no material or technic should be endorsed or indicted on the basis of these data. The exact clinical significance of tracer studies of this nature still remains unknown. The authors are cognizant of the many facets which remain to be investigated. Large numbers of restorations for each material will have to be evaluated for longer time intervals in the oral cavity. Likewise all measurements have been made thus far on the basis of resistance of the margins to penetration by the calcium ion. This ion is small and perhaps constitutes a heroic type of test. Additional work should be done with compounds of greater molecular size. There is the possibility that other inorganic ions or ones with a negative charge might produce entirely different results.

However, the main purpose of this particular investigation was to study the influence of aging with given restorative materials, and standardization with one isotope does reduce the variables involved. Certainly a broad panorama of labeled compounds will be required be-

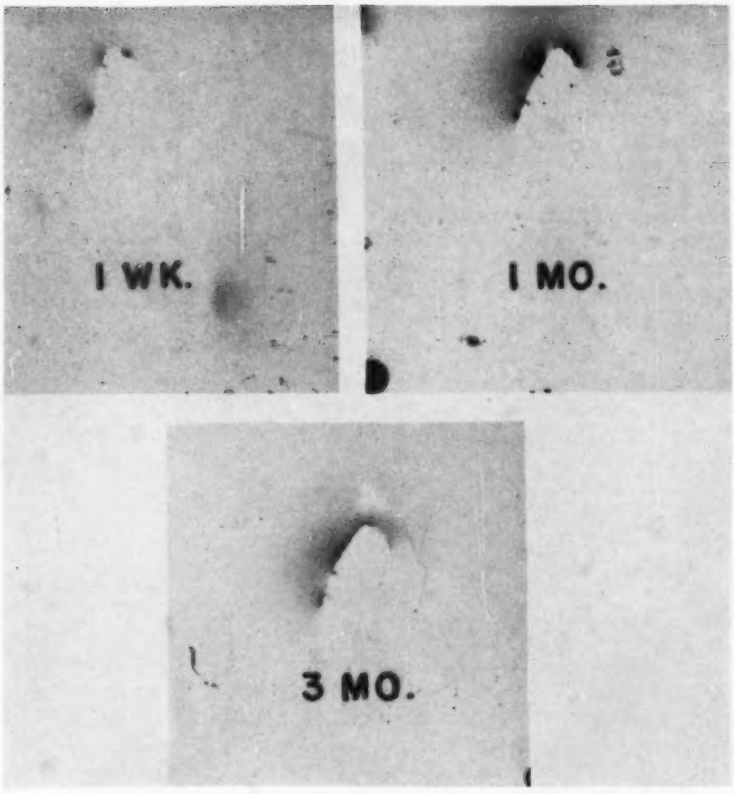


Fig. 10 • Resin restorations in clinical patients

fore the clinical relationships of this phenomenon can be established.

The restorations were subjected to the isotope at room temperature (approximately 25°F. below mouth temperature). Had the temperature been reduced further, greater infiltration of the isotope might have been evident around certain materials. The continued effects of temperature change on the behavior of these materials after longer periods of service cannot be predicted at this time. It has also been evident that in spite of the careful standardization of operative procedures, results do vary within certain limits with different operators.

SUMMARY

A preliminary study has been made of the adaptation of some of the common restorative materials after varying periods of service in the mouths of humans and dogs. Adaptation was studied by the use of Ca^{45}. For the most part the results obtained in the two phases of the study were comparable.

1. Initially the margins of amalgam restorations were readily penetrated by the isotope, but leakage appeared to diminish as the restoration aged. The use of a cavity varnish apparently improved the initial sealing ability of amalgam.

2. The behavior of silicate restorations was variable. Some specimens exhibited gross penetration of the margins whereas less ingress was noted with others. The surface of the material was permeated by the isotope.

3. Some leakage was observed with zinc phosphate cement, but there appeared to be less infiltration around older restorations.

4. The resin materials effected a relatively good seal of the cavity over the short period involved in this experiment.

This study was supported in part by a grant (D-788) from the National Institute of Dental Research, U.S. Public Health Service, Bethesda, Md.

Portions of this paper taken from a thesis by Dr. Schenker in partial fulfillment of the M.S.D. degree, Indiana University, August 1958.

From the department of dental materials, Indiana University School of Dentistry.

1. Grossman, L. I. A study of temporary fillings as hermetic sealing agents. J. D. Res. 18:67 Feb. 1939.

2. Buchanan, G. A. Resistance of self-curing acrylic resin to the passage of dye between filling and cavity wall. J. Canad. D. A. 17:131 March 1951.

3. Massler, M., and Ostrowsky, A. Sealing qualities of various filling materials. J. Den. Children 21:228 Fourth Quart. 1954.

4. Hirsch, L., and Weinreb, M. M. Marginal fit of direct acrylic restorations. J.A.D.A. 56:13 Jan. 1958.

5. Seltzer, S. Penetration of microorganisms between the tooth and direct resin fillings. J.A.D.A. 51:560 Nov. 1955.

6. Rose, E. E., and others. Screening of materials for adhesion to human tooth structure. J. D. Res. 34:577 Aug. 1955.

7. Kraus, E. E., and Kraus, L. L. Evaluation of autopolymer direct plastic filling materials. (Abst.) J. D. Res. 30:498 Aug. 1951.

8. Armstrong, W. D., and Simon, W. J. Penetration of radiocalcium at margins of filling materials: a preliminary report. J.A.D.A. 43:684 Dec. 1951.

9. Sausen, R. E.; Armstrong, W. D., and Simon, W. J. Penetration of radiocalcium at margins of acrylic restorations made by compression and noncompression technics. J.A.D.A. 47:636 Dec. 1953.

10. Crawford, W. H., and Larson, J. H. Fluid penetration between fillings and teeth using Ca^{45}. J. D. Res. 35:518 Aug. 1956.

11. Wainwright, W. W., and others. Microleakage of amalgam fillings. (Abst.) I.A.D.R. 35:76, 1957.

12. Swartz, M. L., and Phillips, R. W. Method of measuring adhesive characteristics of dental cement. J.A.D.A. 50:172 Feb. 1955.

13. Crawford, W. H., and Larson, J. H. Dental restorative materials: amalgams, acrylics. J. D. Res. 33:414 June 1954.

14. McHugh, W. D. Experiments on hardness and adaptation of dental amalgam as affected by various condensation techniques. Brit. D. J. 99:44 July 19, 1955.

15. Charbeneau, G. T., and Peyton, F. A. Some effects of cavity instrumentation on adaptation of gold castings and amalgam. J. Pros. Den. 8:514 May 1958.

16. Fiasconaro, J. E., and Sherman, H. Sealing properties of acrylics. New York State D. J. 18:189 May 1952.

17. Nelsen, R. J.; Wolcott, R. B., and Paffenbarger, G. C. Fluid exchange at margins of dental restorations. J.A.D.A. 44:288 March 1952.

Professional Freedom • With the weakening of geographical and family ties, those of vocation are growing stronger, more and more people are anxious to join with their fellow workers for purposes they are able to understand. . . . This desire has actually been strengthened by the introduction of universal suffrage; for, now that each vote is one among so many, we turn to more practical means of influencing events through our trade union or profession. The professions, especially, are channels for an increasing flow of altruistic effort. In a society largely composed of rootless men and women, some professions are a source of special strength because they have roots going deep into the past and give us a sense of continuity. But a great many of the newer vocations have also formed themselves into professions. Indeed, with the multiplication of new ways of doing things, professionalism is steadily invading new territory. For everyone who has acquired a special technique . . . feels that the community ought to recognize his accomplishments and protect the public against unqualified imitators; in return for which recognition he will gladly obey professional rules and maintain or raise professional standards. *T. F. Fox. Professional Freedom. The Lancet, July 21, 1951.*

Bruxism, a clinical and electromyographic study

Sigurd P. Ramfjord, L.D.S., M.S., Ph.D., Ann Arbor, Mich.*

Thirty-four patients with severe bruxism were studied electromyographically and clinically, before and after occlusal adjustment. The most common occlusal factor in bruxism is a discrepancy between centric relation and centric occlusion; invariably, such a discrepancy is accompanied by asynchronous contractions or sustained strain in the temporal and masseter muscles during swallowing. Occlusal adjustments eliminated the bruxism in all 34 patients. Studies of occlusal relationships are inadequate and inconclusive unless centric relation and swallowing are included. The electromyograph is a sensitive, helpful tool for recording occlusal interferences.

The term "bruxism" is derived from the French "la bruxomanie," first used by Marie and Pietkiewicz in 1907.[1] Frohman[2] in 1931 described "bruxomania" as a purely psychic state and then went on to say that "bruxism is not necessarily audible." This seems to be the first time "bruxism" was introduced in the literature. "Bruxism" was also mentioned by Miller[3] in 1936. Later he suggested using "bruxomania" to denote habitual grinding of the teeth in the daytime and "bruxism" for nocturnal grinding. Other terms have been suggested for habitual grinding of the teeth such as "neuralgia traumatica" (Karolyi),[4] "Karolyi-effect" (Weski)[5] and "occlusal habit neurosis" (Tishler).[6]

At the present, "bruxism" is commonly used to indicate a nonfunctional gnashing, grinding or pressing of the teeth day or night.

A tendency to gnash and grind the teeth in association with feelings of anger or aggression has been recognized since Biblical times, and it has been observed in animals as well as in humans.[7] Even more common is the pressing or clamping of the jaws and teeth in an effort to suppress emotional outbursts such as crying or in relation to nonspecific nervous tension. Gnashing the teeth and pressing them together have a different significance both for the teeth and the p[illegible]odontium. The etiology of these two conditions may also be somewhat different but they are usually both included in the term "bruxism." For the purpose of clarity, "bruxism" in this paper will be used to indicate all nonfunctional gnashing and pressing of the teeth.

PREVALENCE

Since bruxism is performed on a subconscious reflex-controlled level, the habit is commonly unknown to the patient unless it has been called to his attention. Surveys of the prevalence of bruxism are,

therefore, very unreliable and the few reports in the literature[8,9] of such surveys are totally inadequate. However, they indicate that a very high percentage of patients with periodontal disease have bruxism. It has also been found that the prevalence of bruxism is much higher in population groups with malocclusion than in comparable groups with normal occlusion.[10]

SIGNIFICANCE

At the beginning of this century, Karolyi[11-13] was the first to postulate that nocturnal contractions of the masseter muscles might be a main factor in the etiology of "pyorrhea." He emphasized also that spastic contractions of the lip and tongue muscles were damaging to the periodontium and disturbing to the oral comfort of the patients. On the other hand, Eschler[14] found that periodontal disease increased the tonus contraction of the jaw muscles. From his and other investigations,[15] it appears that periodontal disease predisposes the individual to bruxism. The significance of bruxism in the etiology of periodontal disease is controversial. It should be emphasized that bruxism does not necessarily lead to periodontal disease, but it is always a potential source of damaging influence on the teeth, the periodontium, the jaw, the face, neck and tongue muscles, the cheek and tongue mucosa and the temporomandibular joints. Thielemann[5] observed that the greatest amount of periodontal injury from bruxism occurred in patients with steep cusps where the lateral stress from bruxism was applied at the tip of the cusps. The stress at the tip of the cusps has a longer arm of leverage than stress in the central fossa of the teeth, and the stress on the cusps often will be directed outside of the supporting tissues of the teeth. It is also evident that the periodontal significance of bruxism increases with decrease in periodontal support resulting from either periodontal disease or from loss of teeth. Bruxism is often considered the most important factor in the etiology of traumatic occlusion and temporomandibular joint disturbances.[16]

ETIOLOGY

Great emphasis has been placed always on the psychic component in the etiology of bruxism.[2,3,8,17-19] Tishler[6] in 1928 suggested a relationship between occlusal interference and neurotic conditions in the etiology of bruxism (probably unaware of Karolyi's earlier work). He observed that "even mild cases of occlusal trauma or minor occlusal defects such as a sharp cusp" would receive undue attention by neurotic individuals and result in grinding habits. A number of articles have appeared on bruxism, some stressing the psychic component and others maintaining the importance of the local occlusal disharmony in the etiology of this condition. Very little scientific evidence has been offered for either viewpoint. Occupation has been suggested also as a predisposing factor to bruxism.[20-22] Jankelson[23] produced bruxism experimentally by placing acrylic cement on the occlusal surfaces of teeth in ten human beings. A similar observation was made by the author of this article about ten years ago when high occlusal amalgam fillings were placed in lower first molars of ten rhesus monkeys. The monkeys gnashed their teeth vigorously until a few days later when they had worn the amalgam down. Then their bruxism stopped. The histologic sections of these monkeys showed periodontal injury corresponding mainly to the axially directed stress, but there were also zones of injury at the lateral cervical and lateral apical aspects of the roots of the teeth.

SIGNS AND SYMPTOMS

The following clinical signs and symptoms of bruxism have been observed:

1. Facets indicating a nonmasticatory pattern of occlusal wear.
2. Excessive, often uneven occlusal wear with minimal "cupping" of the exposed dentin.
3. Increased muscle tonus and uncontrolled resistance to manipulation of the mandible.
4. Compensatory hypertrophy of the masticatory muscles, especially the masseter.
5. Increased mobility of the teeth.[24]
6. Dull percussion sound from the teeth.
7. Tired feeling in the muscles of the jaws when waking in the morning.
8. "Locking" of the jaw and a tendency to bite the cheeks, lips, or tongue.
9. Tenderness of the masticatory muscles to palpation.
10. Temporomandibular joint discomfort or pain.
11. Soreness of the teeth to biting stress.
12. Pulpal sensitivity to cold.
13. Audible sounds from bruxism.

If any of these signs or symptoms of bruxism are observed by the dentist and called to the attention of the patient, the habit will often be brought up to the conscious level and a positive history of bruxism may be obtained at a subsequent appointment.

THERAPY

Karolyi[4, 11-13] recommended bite-raising gold caps on the molars ("Aufbisskappen") to be used at night for patients with bruxism. He also recommended vulcanite splints covering the occlusal surfaces of all the teeth.[4] A number of articles have appeared since that time on the use of various types of occlusal splints for patients with bruxism.[15-17, 25-30] Some splints were for the purpose of hindering the grinding movements and others for stabilizing teeth and preventing excessive occlusal wear. If such splints are used, it is important that they do not change the occlusal relations of the teeth.

Occlusal adjustment in the treatment of bruxism was introduced by Karolyi[11] in 1901. Tishler[6] in 1928 stated that correction of occlusal disharmony would result in immediate disappearance of the habitual grinding of the teeth since the adjustment would remove the exciting factor. Several authors have since observed cessation of bruxism following occlusal adjustment[15, 27, 31] or oral reconstruction, with or without bite-raising.

Various forms of psychotherapy including psychoanalysis[2] have been recommended for the treatment of bruxism. Autosuggestion has been a favorite among several authors,[8, 9, 17, 18, 27, 32] and more recently hypnosis has been recommended.[33] "Tranquilizers" or similar drugs[34] have been found to be helpful aids in occlusal adjustment, but their action is transient and limited. When the use of the drug is discontinued, the patient will revert to his habit of bruxism.[35]

PURPOSE OF PRESENT INVESTIGATION

It has been observed over several years of practice and teaching that in most instances bruxism may be eliminated by occlusal adjustment. The results have varied from complete and lasting elimination of all forms of bruxism to partial or transient elimination of the habit. In several cases, occasional clenching of the teeth, rather than eccentric grinding, has persisted after the adjustment. Some patients, after the adjustment, have substituted for bruxism some other related habits such as tongue, lip or cheek biting or biting on foreign objects. It has also been observed that elimination of centric and balancing interferences was of greater importance for halting of bruxism than was removal of working side and protrusive interferences. The requirements for accuracy of the adjustment to eliminate the habit varied greatly from one patient to another.

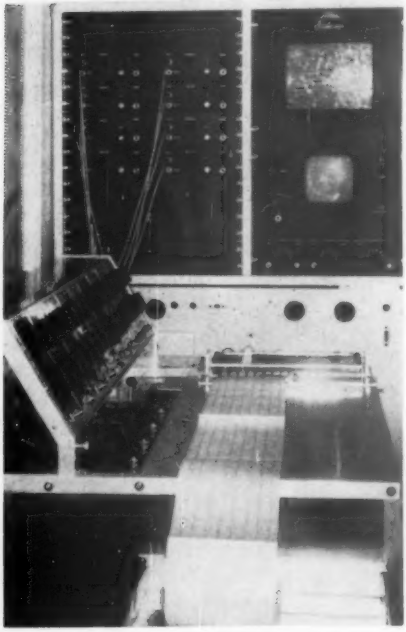


Fig. 1 • Equipment used for the electromyographic part of the study. The Faraday cage is to the left on this picture

Since a definite relationship had been observed between occlusion and bruxism, it was decided to apply the relatively new technic of electromyography to a study of the contraction pattern of some of the masticatory muscles in individuals with bruxism. Furthermore, the electromyographic findings could be related to a clinical analysis of the occlusion. The same patients could be studied also after occlusal adjustment.

Electromyographic technic and interpretation have been discussed in several recent papers to which reference is made.[36-41] The purpose of this paper is to report a combined clinical and electromyographic study of the nature of bruxism and the clinical and electromyographic effect of occlusal adjustment on some of the masticatory muscles and the patient's habit of bruxism.

MATERIAL

Thirty-four patients with severe bruxism aged 19 to 60 years (mean age of 31 years; 12 females and 22 males) were studied before and after occlusal adjustment. Several of these patients had pain in the temporomandibular joints and the jaw muscles. The findings related to the temporomandibular joint problems will be reported in a separate paper. Only patients with known severe bruxism were included in the study.

METHOD

The electromyographic recordings were made with a 24 position, eight-channel Grass Electroencephalograph, Model IV A, modified for electromyography (Fig. 1). A single-channel and an eight-channel oscilloscope were also available and could be integrated with the ink writer of the electromyograph at any time. The oscilloscope was found to be impractical for studies involving occlusal contacts, and it was used only occasionally for study of rest position. Surface electrodes were placed bilaterally on the temporal and masseter muscles with the ear lobes as reference points as suggested by Moyers.[36] The anterior and posterior borders of the temporal and masseter muscles were determined by palpation during isometric contraction of the muscles. Three electrodes were placed on each temporal muscle[36] (on the anterior, medial and posterior groups of fibers) and one electrode on the middle of the bulging part of each masseter muscle. The recording paper was moved at a speed of 60 mm. per second (fast speed, the distance between ten vertical lines on the paper), but could be slowed to 30 mm. (medium speed, five vertical spaces) or 15 mm. (slow speed, two and a half vertical spaces) per second. Calibration of the gain was recorded carefully. The patients were placed within a Faraday cage (Fig. 1) and seated upright, with-

out head support, in a dental chair during the recording. They were instructed to look at the opposite wall at the level of their eyes and sit with their arms and feet comfortably supported. A casual interview, without detailed history and examination, preceded this initial recording.

All of the patients went through the following routine for the electromyographic recording:

1. It was ascertained that the patients were sitting in the desired position.

2. The rest position was determined and recorded; various routine clinical procedures were used to determine the rest position (relax method, swallow method, Mississippi method, and so on).

3. The patient was instructed to tap his teeth lightly together from rest position.

4. The patient was instructed to bite from rest position to maximal solid occlusal contact ("centric occlusion") by common definition).[42]

5. The patient was given a cup of water to drink.

6. The operator applied mild distal pressure on the patient's mandible in an attempt to locate "centric relation"[42] (the most retruded position of the mandible from which opening or lateral movements can be performed), the terminal hinge position. After this position had been located, the patient was instructed to tap his teeth lightly together, maintaining the same contact relationship without the operator's hand on his teeth.

7. The glide from centric relation to centric occlusion ("slide in centric") was recorded.

8. Right lateral excursions from centric occlusion to end to end occlusion of the cuspids and then back to centric occlusion were recorded, maintaining light occlusal contact during the entire procedure.

9. Same as no. 8 but to the left.

10. A combination of right and left excursions moving through centric occlusion (as outlined in no. 8 and 9).

11. Protrusive excursions from centric occlusion and back again were recorded with the teeth in light contact.

12. Right lateral excursions from rest position and back to rest position without occlusal contact.

13. The same as no. 12 but to the left.

14. Movements of the mandible from right to left and back to right through rest position and without occlusal contact.

15. Protrusive excursions from rest position without the teeth contacting and back to rest position.

16. Mastication of chewing gum on (a) right side, (b) left side and (c) on the anterior teeth.

Each step was repeated several times with a session of electromyographic recordings lasting 45 to 60 minutes.

A systemic and dental history was then obtained. Main emphasis was placed on:

1. Psychic or physical stress.

2. History of bruxism, temporomandibular joint or muscle pain or discomfort.

3. Loss of teeth and replacements.

The history was followed by a clinical functional analysis and a roentgenographic study. Occlusal interferences in centric relation, lateral and protrusive excursions were located and recorded. The patient's habitual masticatory pattern was noted also.

After the examination, the occlusion was adjusted. This required from one to five half-hour sittings. The occlusal relations and the patient's symptoms were re-evaluated prior to each adjustment.

The previously described electromyographic recording session was repeated when the patient's occlusion seemed well adjusted. The electromyographic recording revealed occlusal interferences in several instances that had been overlooked clinically. This necessitated a readjust-

ment and a new electromyographic recording. Two to five series of electromyographic recordings were made for each patient.

An attempt was made always to adjust the occlusion until mandibular stability in centric relation (terminal hinge position) was attained. All balancing interferences were removed and the balancing side contacts were made lighter than the working side contacts. The patient's jaw was guided into retrusive lateral movements during adjustment of lateral excursions. On the working side the main emphasis was placed on smoothness of the gliding occlusal movements rather than on the number of contacts and steepness of guiding cusps. Only minimal adjustment was done on the maxillary anterior teeth in protrusive excursion. At the completion of the adjustment, great emphasis was given to elimination of "catches" that the patient could find in any excursion or combination of excursions.

At the beginning of the study, zoxazolamine (Flexin) was used as an aid to secure muscle relaxation, but equally good results seemed to be obtained later without any drug.

The follow-up electromyographic recording was done at various time intervals (one-half hour to several months) after the occlusal adjustment. The total time of observation varied from a few months to three years. During the time of observation, the patients were re-examined and questioned about possible recurrence of their habit.

FINDINGS

In order to make the presentation of the findings more meaningful, an outline will be given on the concept of bruxism that emerged from this study.

The pattern of mandibular movements within the functional range of the teeth is determined from a combination of nervous impulses derived from the various proprioceptors and sensory nerve endings in the masticatory system. These impulses are evaluated and transferred to efferent signals by the nerve center of the reflex system. Masticatory movements are the result of a conditioned, learned, reflex pattern which, under physiologic conditions, will satisfy the basic requirements to optimal function without damage to any part of the masticatory system. The importance of a reflex-controlled combination of synergistic and antagonistic impulses for the establishment of a well-balanced smooth function of the masticatory system has been stressed by several recent investigators.[36, 43, 44]

Furthermore, Moyers,[36, 38] Perry, Harris[43, 44] and others[45, 46] found that individuals with malocclusion have an asynchronous contraction pattern of the masticatory muscles. In these cases occlusal movements start as motor units come into action, but the movements are later inhibited through reflex action by disorganized excitation of proprioceptors in the periodontal membranes or the temporomandibular joints. The reflex center will try then to work out a compromise pattern of occlusal movements which will inflict the minimum of irritation and damage on the involved tissues, but often this process of adaptation is disturbed by a change in excitability thresholds of the neurons which govern the jaw movements. Such changes can be brought about by impulses of both peripheral and central origin. The state of facilitation associated with an increased rate of impulses may exaggerate the ordinary impact upon the neuron and elicit efferent impulses and peripheral muscle contractions which are out of normal proportion to the original stimulus. The threshold of the neurons may be greatly changed also by influence from the central nervous system as associated with general stress and nervous tension.

Another related phenomenon to be considered is muscle tonus. A stretch of

constant degree, such as the force of gravity on the mandible, causes a maintained state of muscle contraction utilizing only a few alternating muscle fibers at any given time. This steady reflex contraction, usually seen in muscles which are concerned with the maintenance of posture and counteraction of gravity, is called tonus. The fundamental basis for tonus is the myotatic reflex center in the spinal cord, but the degree of tonus may be altered by impulses both of peripheral and central nervous system origin. A state of hypertonus in the masticatory muscles may be due, therefore, to either local disharmony between the functional parts of the masticatory system or to increased nervous excitability. Usually it is due to a combination of both these factors. When the limit for adaptation to occlusal disharmony has been surpassed, hypertonic response will be created in the masticatory muscles. This may result in an injury either to the supporting structures of the teeth or the temporomandibular joints. Such an injury will convey increased stimuli to the nerve center with subsequent increased efferent signals resulting in a tendency for further injury. Secondarily, this status of discomfort may affect the central nervous system, which again may influence the irritability threshold of the reflex center. Overfatigue and subsequent pain from sustained contraction of the muscles will lower also the irritability threshold of the neurons in the reflex center and enter this "feed-back" mechanism. This vicious cycle of self-perpetuating increase in muscle tension related to dysfunctional disturbances in the teeth, the periodontium, the temporomandibular joints and the masticatory muscles is the basis for bruxism.

The hypertonic, sometimes painful, status of the muscles of mastication in bruxism is similar to the "occupational myalgias" in the arm and neck muscles of typists under mental stress, or the postural myalgias manifested as "backache" in persons with postural anomalies under psychic tension.

Integration between the psychic and local factors in all of these dysfunctional conditions is so intimate that it is almost impossible to evaluate the significance of each factor separately, but both local and systemic factors have to be present to elicit bruxism.

The local or "trigger" factors in bruxism are related to occlusal disharmony, periodontal disease, pathologic conditions in lips, cheeks and tongue or irritation and pain anywhere in the masticatory system.

The systemic factors of psychic tension are often masked and overcompensated for by an outward appearance of utter calmness which readily may deceive the examiner. It is also extremely difficult to locate occlusal interferences in such patients because of the tenseness and "splinting action" of their jaw muscles. Consequently, the cause and effect relationship between occlusal interference and psychic tension in bruxism is often overlooked.

CLINICAL AND ELECTROMYOGRAPHIC FINDINGS

The findings will be discussed in the order of the electromyographic recording. A rest position with electromyographically normal muscle tonus could be recorded for most of the patients (Fig. 2). This electromyographic rest position did not necessarily coincide with the clinically determined rest position. It often required a slight opening from clinical rest position to achieve a mild, even tonus contraction of the temporal and masseter muscles. This even tonus contraction could be maintained usually for several millimeters of further opening. At times it was impossible to obtain a balanced rest position recording in patients with discomfort or pain in the temporomandibular joints or in the muscles (Fig. 3). Discomfort in sitting position (in one

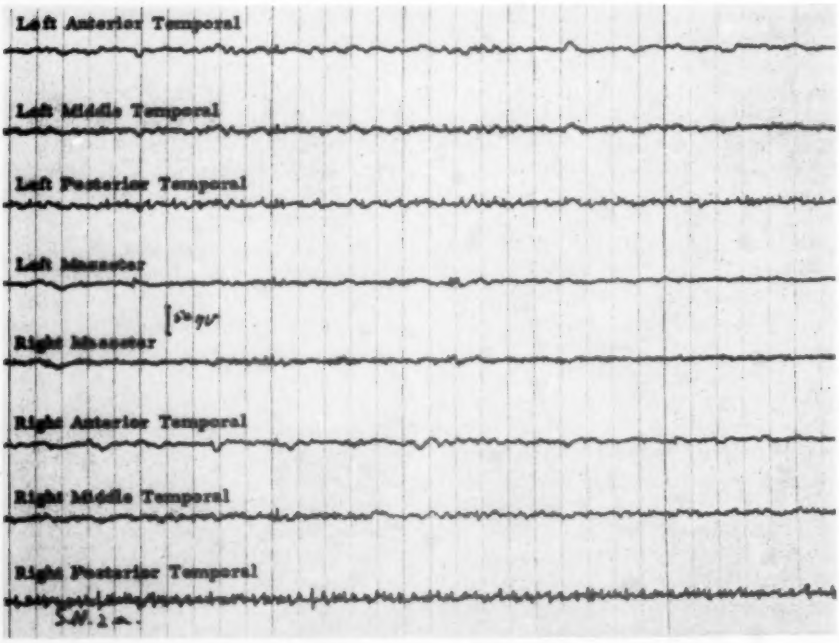


Fig. 2 • Electromyogram of normal tonus activity in rest position in spite of severe occlusal disharmony and symptoms of discomfort and pain in the recorded muscles on both sides. The main occlusal discrepancy was a 2.5 mm. slide forward and to the right side from centric relation to centric occlusion (fast speed)

patient a toe went to sleep), eye strain, distracting noise, apprehension and general nervous tension were factors which could disturb the tonus of the muscles. In one patient, the least disturbed recording of rest position was obtained when she was holding her teeth in light contact. After occlusal adjustment, a well-balanced tonus or rest position recording could be obtained in all of the patients (Fig. 4). This would indicate that the disturbance in tonus of the temporal and masseter muscles was related directly to the removed occlusal interferences. Muscle exercises or simply holding the teeth apart over an extended period of time tended to eliminate the muscle memory of the occlusal interferences and equalize the contraction pattern of the muscles. Speaking to the patient in a soft monotonous voice or administering zoxazolamine also would decrease the abnormal muscle contractions in rest position.

These observations indicated that the muscle tonus in patients with bruxism is influenced both by local (occlusal) and systemic (central nervous system) stimuli. However, when the local disturbing stimuli were eliminated, a well-balanced tonus or rest position could always be recorded.

The initial light tap from rest position to occlusal contact often showed a disturbed and changing contraction pattern (Fig. 5) which after some more taps gradually settled down to a fairly harmonious pattern as the patient's neuromuscular mechanism located a comfortable relationship of the teeth. A sustained

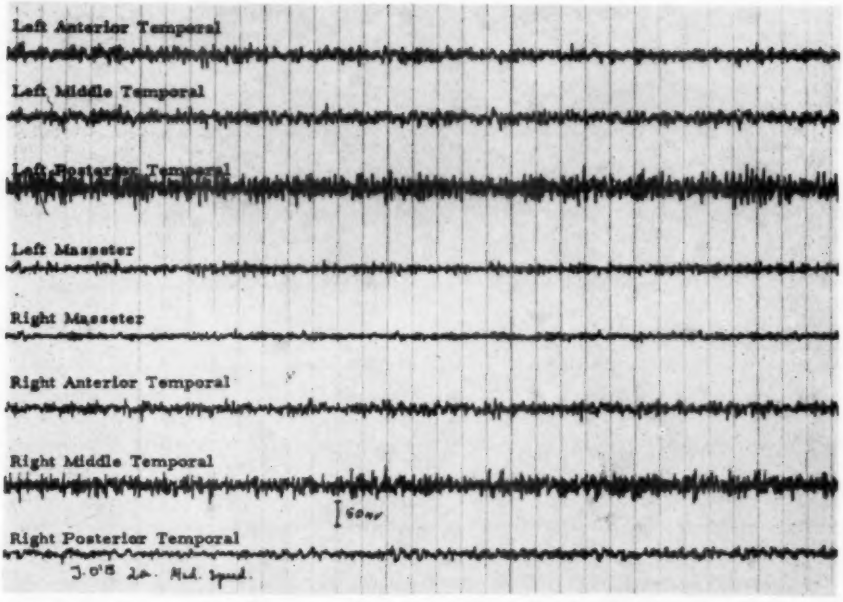


Fig. 3 • "Rest position." It was not possible to locate a true rest position with balance of tonus activity for this patient. Complaint of muscle fatigue and pain in the left temporomandibular joint occasionally. One and a half millimeter slide forward and to the right from centric relation to centric occlusion (medium speed)

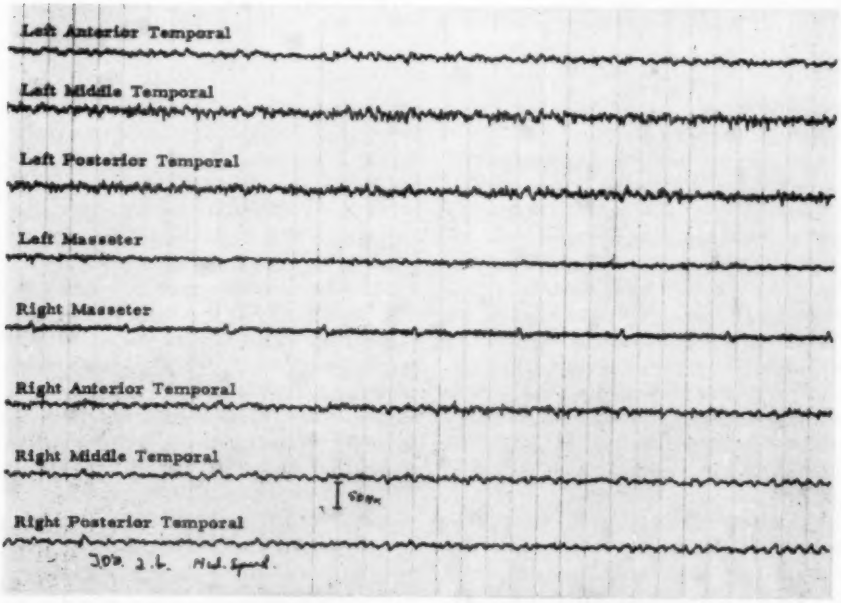


Fig. 4 • Recording of rest position from the same patient as Figure 3 after occlusal adjustment. Note fairly good balance of tonus activity compared with Figure 3 (medium speed)

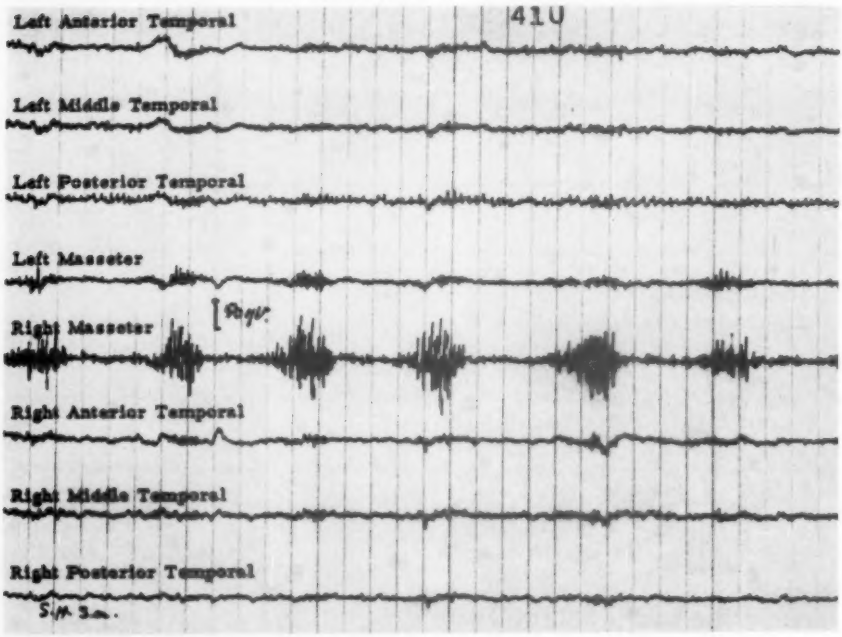


Fig. 5 • Light occlusal tap from rest position. Same patient as Figure 2. Considerable imbalance in muscular activity corresponding to the occlusal disharmony (medium speed)

strain with lack of relaxation between each tap was seen in some cases. After the adjustment, a definite relaxation between the taps was found.

Electromyographic records of muscle action in centric occlusion should be interpreted with great caution. The first few times a patient bites lightly together from rest position to centric occlusion (providing he has had his teeth apart for some time), the recording may indicate imbalance of occlusion, but muscle memory and conditioned guidance may soon establish an optimal contact relationship of the teeth in biting, and subsequently an even contraction pattern of the muscles will appear. If the patient is biting hard together in centric occlusion, a large number of muscle fibers will be engaged in all of the elevator muscles and the difference in contraction related to uneven occlusal contact will be masked (Fig. 6). It is entirely erroneous to assume that an electromyographic recording of an even and well synchronized contraction pattern of the masseter and temporal muscles in centric occlusion is a reliable indication of an ideal centric relation between the jaws and the teeth.

Initially, all of the patients showed some disturbance of the contraction pattern of the muscles during swallowing. Various spastic and asynchronous contraction patterns were observed (Fig. 7, 8). Five of the patients did not bring their teeth together when they swallowed. The act of swallowing was accompanied by considerable sustained muscle activity in these individuals (Fig. 9). One patient swallowed with her teeth apart and then brought them firmly together in centric occlusion immediately after the

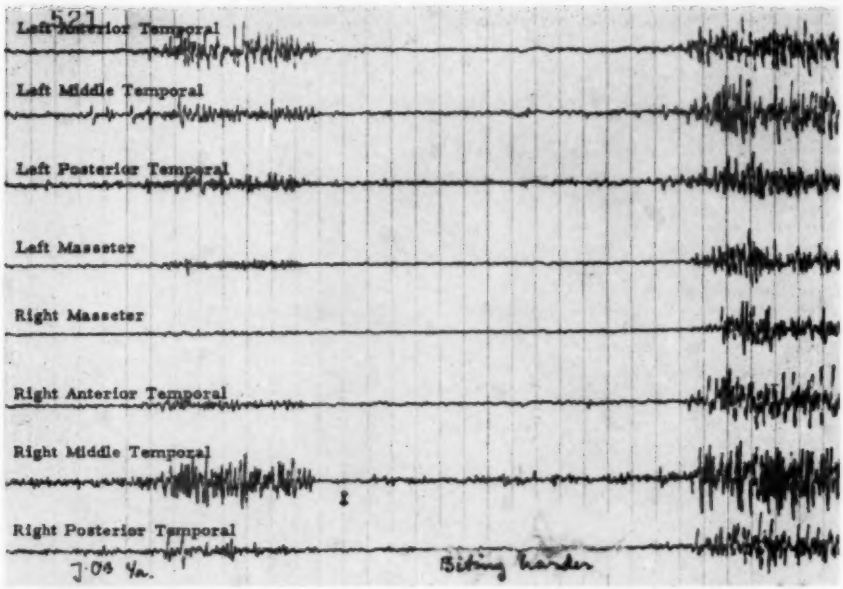


Fig. 6 • Biting from rest position to centric occlusion. Light occlusal pressure on the left side of the electromyogram and biting harder on the right side. The uneven contraction pattern of the muscles (corresponding to the occlusal disharmony) in light occlusion to the left is almost "masked" by the large number of muscle fibers contracting in heavy occlusion to the right. Same patient as Figure 3 and 4 (fast speed)

swallow. In other cases the teeth were barely touching during swallowing and no distinct electromyographic pattern of swallowing could be recorded. After occlusal adjustment all of the patients consistently brought their teeth together when they swallowed and a definite relaxation could be recorded between each swallow (Fig. 8). The occlusal adjustment was not considered complete until all electromyographic irregularities in swallowing were eliminated. Only one patient had to terminate the treatment before the "slide in centric" was eliminated completely, and the electromyographic recording showed a slightly disturbed pattern of swallowing. However, the clinical result in this case was good with at least temporary elimination of the bruxism and the discomfort in the muscles and temporomandibular joints. His residual "slide in centric" was less than 1 mm. and almost on a horizontal level.

When the patients were trained to tap their teeth together in centric relation (terminal hinge position), some tension invariably appeared in the posterior fibers of the temporal muscles.[47] Strain in some of the other recorded muscles appeared also in this position as reported by Moyers[38] (Fig. 10). After adjustment, an even bilateral strain was observed in the posterior fibers of the temporal muscles of most of the patients when the patient was told to hold his jaw in centric relation. However, when the operator pushed the patient's jaw back with a mild, steady pressure, in most instances the electromyographic activity of all of the muscles was found to be even less than the activity associated with normal tonus in rest

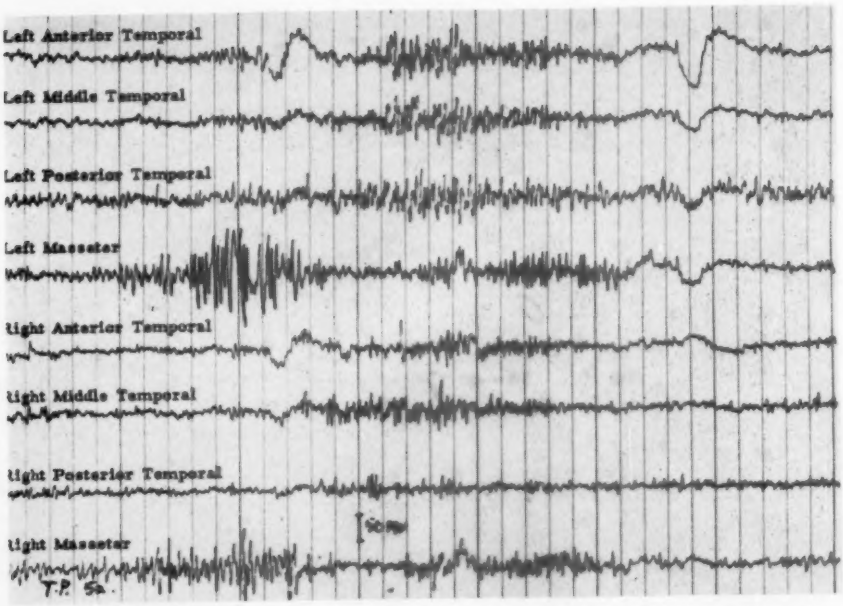


Fig. 7 • Swallowing. Marked by disturbed contraction pattern of the muscles associated with a 2 mm. forward "slide in centric" and uneven occlusal contacts on gold inlays (fast speed)

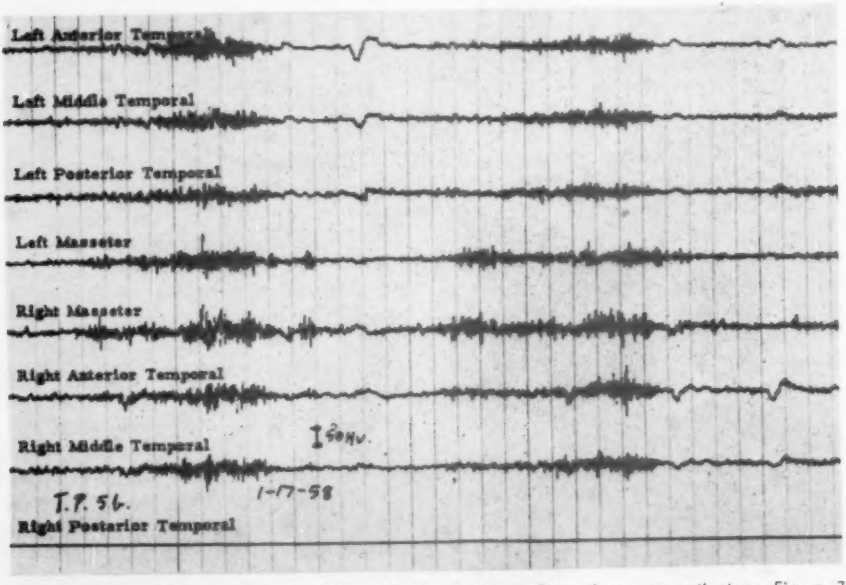


Fig. 8 • Recording of swallowing after occlusal adjustment from the same patient as Figure 7 (Channel 8 was out of function). Note harmonious integration of muscle activity. The contraction of the masseter muscles just prior to the occlusal contact activity is normal and associated with bringing the teeth apart in the initial phase of the swallowing (medium speed)

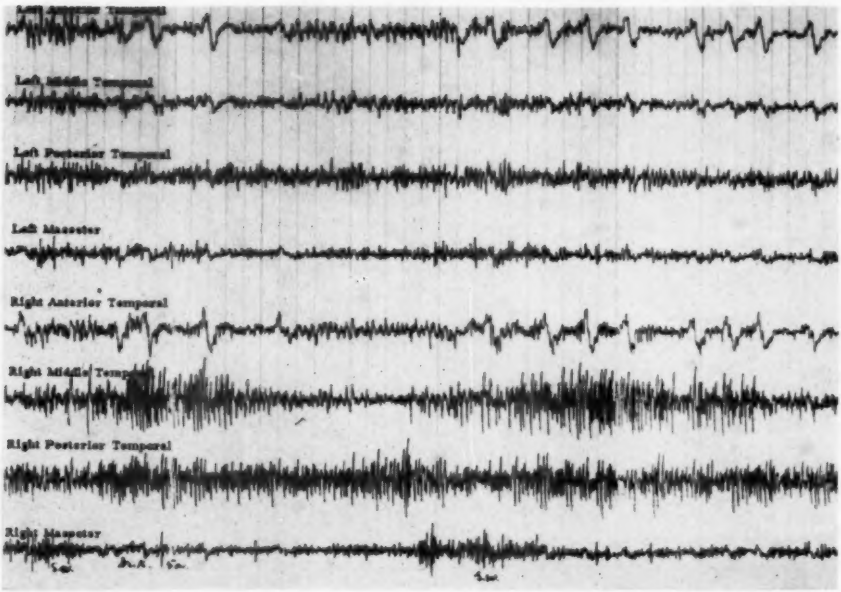


Fig. 9 • Strained swallowing with the tongue between the teeth. Spastic, uncoordinated muscle action. A slide of 1.5 mm. forward and to the left side from centric relation to centric occlusion was the only occlusal discrepancy in this patient. Note tension in the right posterior temporal muscle fibers as a response to the slide to the left (fast speed)

position (Fig. 10). In other cases, a complete relaxation of the muscles could not be obtained until the occlusal adjustment had been at least partially completed.

A slide from centric relation to centric occlusion ("slide in centric") was observed in all of the patients. Spastic muscle contractions were observed occasionally during this sliding movement.

About a third of the patients were unable on command to perform lateral excursions with the teeth in contact. Attempts at lateral excursions in these instances elicited completely uncoordinated spastic muscle contractions, often of an antagonistic nature with simultaneous contractions on both sides (Fig. 11). Occlusal interference on the balancing side was accompanied definitely with the most severe disturbance of muscle function. Ledges on the teeth between the masticatory pattern of wear or facets and the bruxism facets occasionally acted as neuromuscular blocking mechanisms on the working side and elicited severe muscle spasms when attempts were made to pass the mandibular teeth over these ledges.

The steepness of the cusps on the working side and the number or placement of the functioning contacts did not seem very important for the balance of the muscle function. Only two patients had their most severe muscle spasms associated with heavy working contacts on steep inclines of maxillary cuspids. Both patients had extremely tense muscles and temporomandibular joint pain. Clinical and electromyographic evidence of smooth gliding contacts and harmonious muscle action in bilateral movements

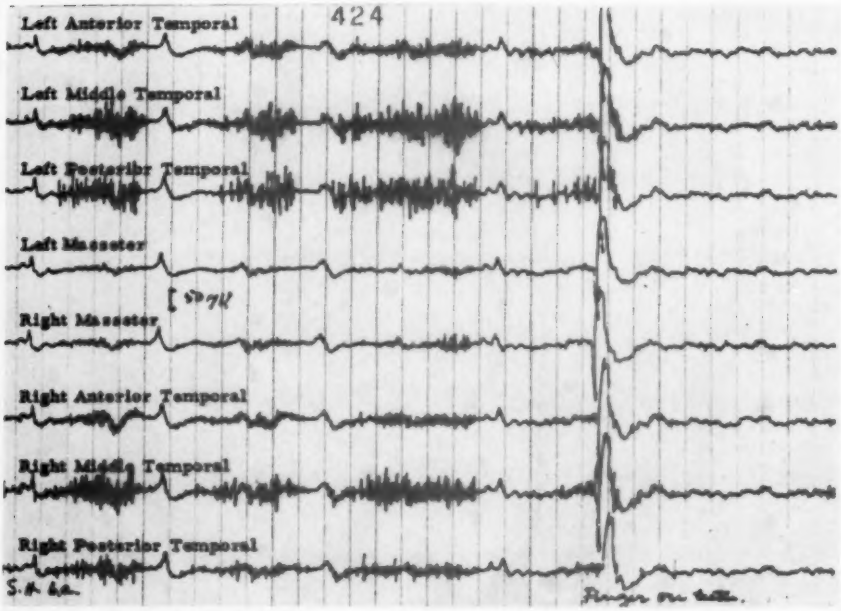


Fig. 10 • Left two thirds of the electromyogram is a recording of the patient's attempt to tap his teeth together in centric relation in the presence of severe occlusal disharmony. On the right third, the operator is holding his hand on the patient's lower anterior teeth with a light pressure posteriorly. The action potential from the muscles is then even less than the rest position tonus. Recording from same patient as Figures 2 and 5 (fast speed)

was established for all of the patients after the occlusal adjustment (Fig. 11-14).

Only minor occlusal adjustment was done for the protrusive excursion. Incisal ledges from bruxism were eliminated, but no attempt was made to reduce the overbite or flatten the incisal guidance.

Disturbance of the contraction pattern of the muscles in lateral excursions from rest position was observed mainly in patients with temporomandibular joint or muscle pain. However, the splinting action of the muscles in relation to occlusal interferences carried over in a few cases to prevent even the noncontact movements. A few patients with very tense jaw muscles had greater difficulty with lateral and protrusive movements when their teeth were apart than when they were contacting. The disturbances in noncontact movements responded very favorably to occlusal adjustment.

The electromyographic findings associated with chewing of gum were not very startling and did not contribute much toward the understanding of occlusal relations and bruxism. Most patients had worn in a habitual pattern of mastication with excellent muscle coordination. However, when they attempted to chew away from this favorite pattern disturbed contractions of the muscles appeared (Fig. 13, 14). Three patients had an ideal bilateral masticatory pattern, both from a clinical and electromyographic standpoint, before any occlusal adjustment was made.

Only in two instances could the "slide in centric" be identified in the electro-

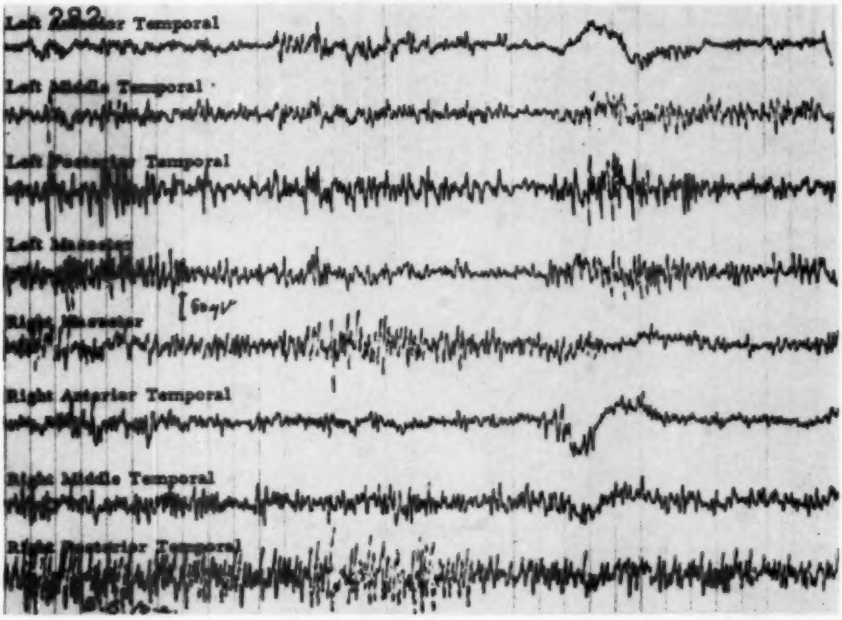


Fig. 11 • Record of an inhibited attempt to perform lateral excursions. Spastic uncoordinated muscle action. Some dull pain in the jaw muscles and severe balancing interference on both sides (fast speed)

myographic recordings of mastication (Fig. 13). Disturbances in the masticatory muscle pattern associated with balancing interference was observed in several cases (Fig. 15). The extent of the lateral excursions in mastication was indicated by a difference in the timing of the contraction potential from one side to the other (Fig. 16). In protrusive mastication various deviations from straight protrusive could be observed (Fig. 17). Harmonious bilateral masticating function was established in all of the patients after the occlusal adjustment (Fig. 18).

The patients were questioned, and, if possible, re-examined from several months to three years after completion of the treatment. All of the patients declared that they stopped the habitual grinding of their teeth after completion of the occlusal adjustment. However, two patients stated that a few months after the treatment they developed new "high spots" and occasionally ground their teeth again. All of the patients have experienced lasting relief from their temporomandibular joint and muscle discomfort. Three patients stated that they still clench their teeth firmly together under nervous strain, but have completely abolished the grinding in lateral or protrusive excursions. They have no discomfort associated with the clenching of the teeth.

DISCUSSION OF FINDINGS

A disturbed contraction pattern of the muscles during swallowing was found in all of the patients with bruxism. All of the patients also had some discrepancy between centric relation and centric oc-

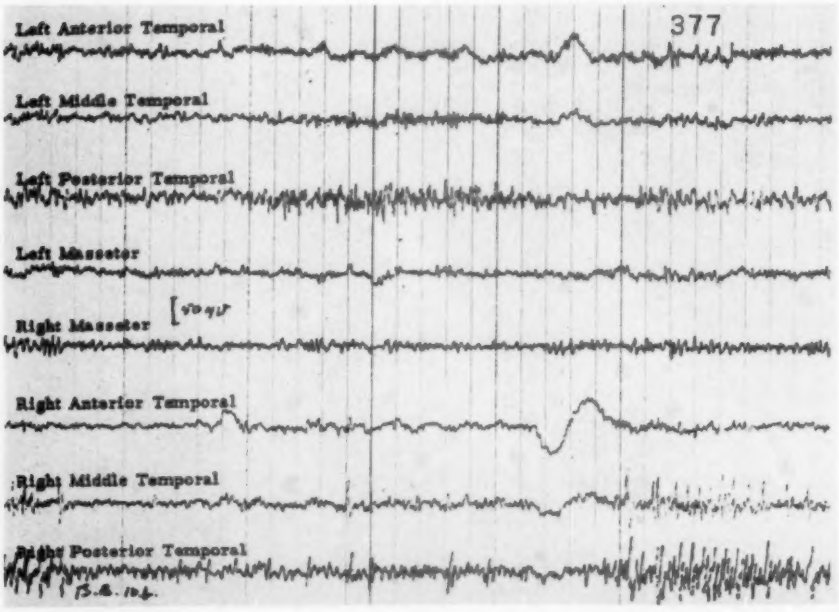


Fig. 12 • Record of lateral excursions starting with right lateral excursion on the extreme left hand side of the electromyogram, moving over to the left excursion at the middle of this recording and to the right excursion again at the right hand side of the electromyogram. This well coordinated movement pattern is from the same patient as Figure 11 after occlusal adjustment (fast speed)

clusion. When this discrepancy or "slide in centric" was eliminated by occlusal adjustment, a harmonious contraction pattern of the muscles during swallowing ensued.

These observations indicate that occlusal disharmony between centric relation and centric occlusion may disturb the contraction pattern of the masticatory muscles in a similar way as the occlusal interferences in the other ranges of occlusal contacts which have been studied electromyographically in several investigations.[36, 40, 43, 44, 46, 47] However, the disturbance from "slide in centric" is associated almost exclusively with swallowing. The previous electromyographic studies of occlusion have failed to consider the extremely important factor of swallowing and its relation to the old problem of "centric." Of course, Jankelson[48] and other prosthodontists have been aware of the distal thrust of the mandible during swallowing for a long time. The electromyographic observations reported in this paper are further indications of the significance of centric relation for complete occlusal harmony.

Infantile (visceral) swallow is based on an unlearned primary reflex pattern in the baby. The seventh cranial nerve muscles are mainly utilized for this type of swallow.[49, 50] Later when the teeth come into functional occlusion, the swallowing pattern changes to the adult (somatic) swallow where the fifth cranial nerve muscles are dominating. The influence of the occlusal relations of the teeth on the development of the muscular contraction pattern in the somatic swallow is not known. It may be assumed that the somatic swallow pattern is more

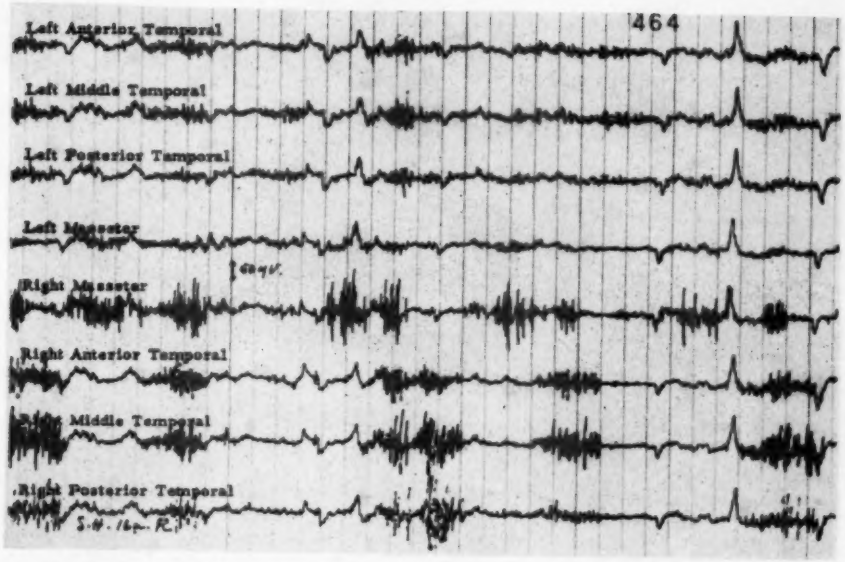


Fig. 13 • Chewing on the right side. This patient (same as Figures 2, 5 and 10) had a 2.5 mm. "slide in centric," and the dual peaks of the electromyographic "spikes" indicate the effect of this "slide" on the masticatory movements. Also lack of bilateral muscle coordination (medium speed)

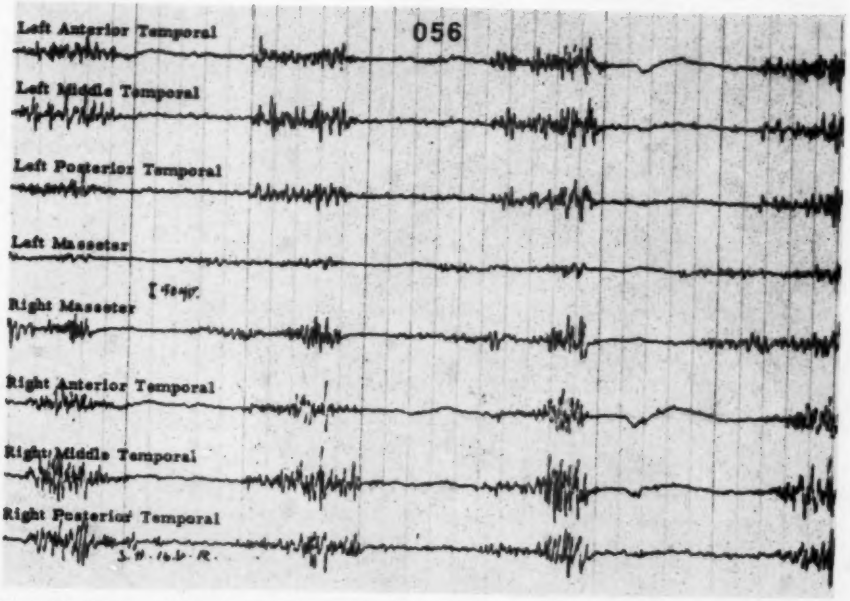


Fig. 14 • Same patient and same movements as Figure 13 (chewing on the right side), after occlusal adjustment. Note harmonious bilateral muscle action (fast speed)

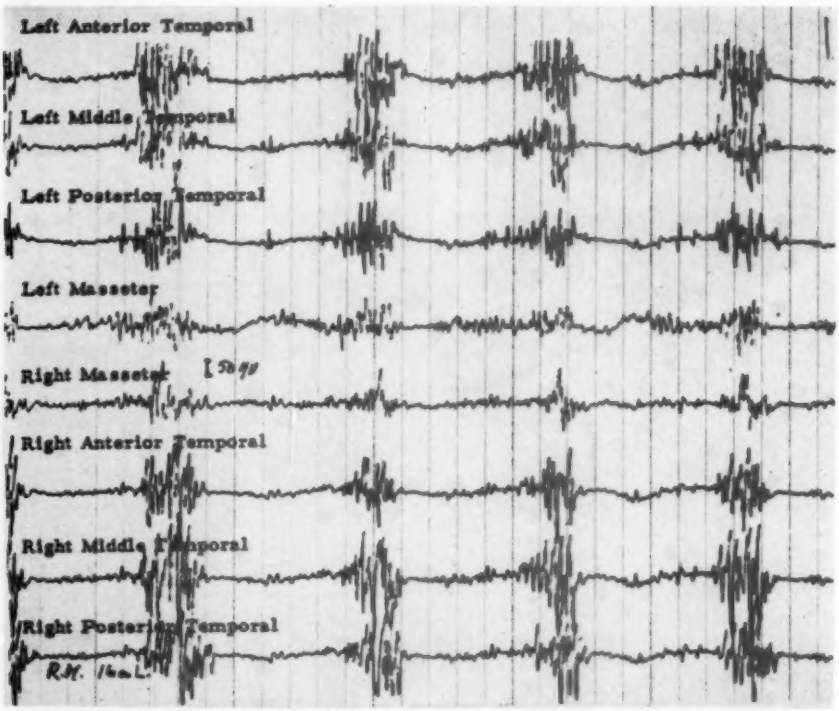


Fig. 15 • Chewing gum on the left side in the presence of heavy balancing side contact. The right side muscles dominate in left side mastication instead of the normal stress distribution of weaker action, especially of the masseter muscle, on the balancing side (fast speed)

conditioned by environmental stimuli than the visceral pattern, and consequently somewhat more amenable to change. A primary or unlearned reflex pattern is much more deep-seated and difficult to change than the learned, conditioned, reflex pattern of the masticatory movements. Although most individuals can learn to avoid occlusal interferences in lateral and protrusive excursions, it seems much more difficult to learn to avoid occlusal interferences related to the swallowing position of the jaw since this probably involves changes in a more basic reflex pattern. It was interesting to note that five of the patients had a visceral type of swallow with the tongue between the teeth and a lack of rhythmic contraction of the fifth cranial nerve muscles during swallowing. Later, when the occlusion was adjusted, the patients resumed the somatic swallow with the teeth securely together. The implications of these findings on restorative and prosthetic dentistry will be discussed in a separate paper.

One patient who complained of persistent bruxism after what was considered a complete occlusal adjustment showed electromyographically a disturbance of her swallowing muscle pattern in an otherwise ideal occlusion. A clinical reexamination revealed a very slight anterior glide of the mandible from centric relation when she was biting firmly together (Fig. 19). When this "slide" was

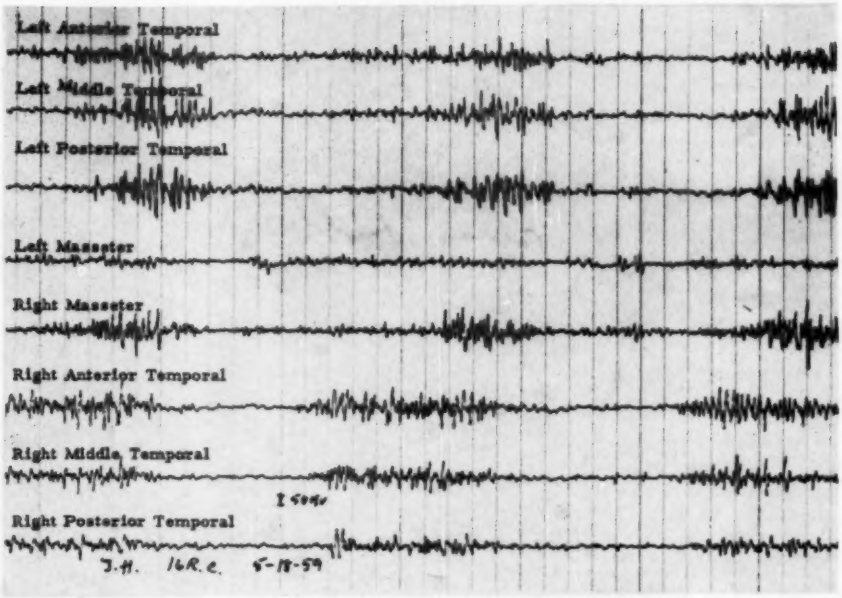


Fig. 16 • Chewing gum on the right side. Two years after occlusal adjustment. The action in the temporal muscle on the right side precedes the left side considerably. This corresponded to a wide lateral excursion in masticating (fast speed)

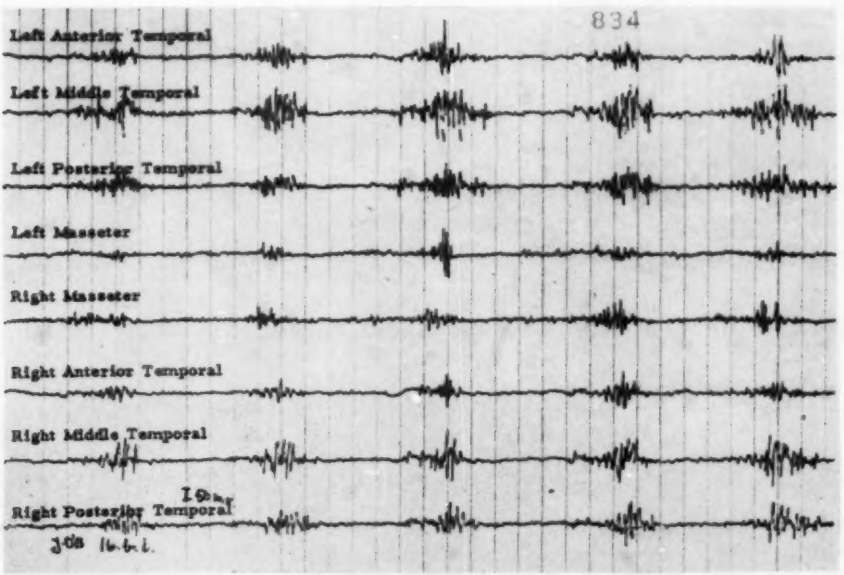


Fig. 17 • Chewing gum on the front teeth after occlusal adjustment. Same patient as Figures 3, 4 and 6. Note changes in action potential of the masseter muscle as the movements shift slightly toward the right or the left (fast speed)

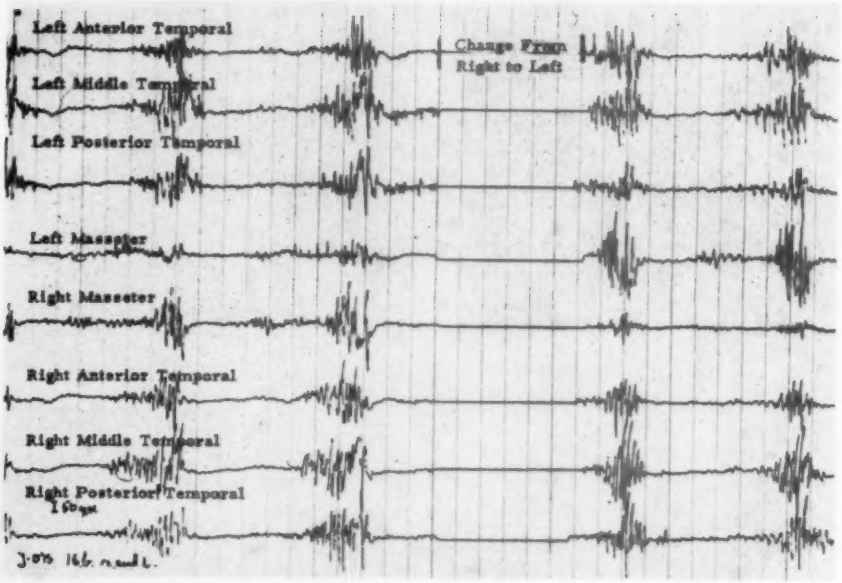


Fig. 18 • Bilateral chewing of gum after occlusal adjustment. Same patient as Figures 3, 4, 6 and 17. The change from right to left mastication is indicated on the middle of the electromyogram. Note the marked shift in masseter action with shift in side of mastication. In contrast to the patient in Figure 16, this patient chews with very small lateral excursions (fast speed)

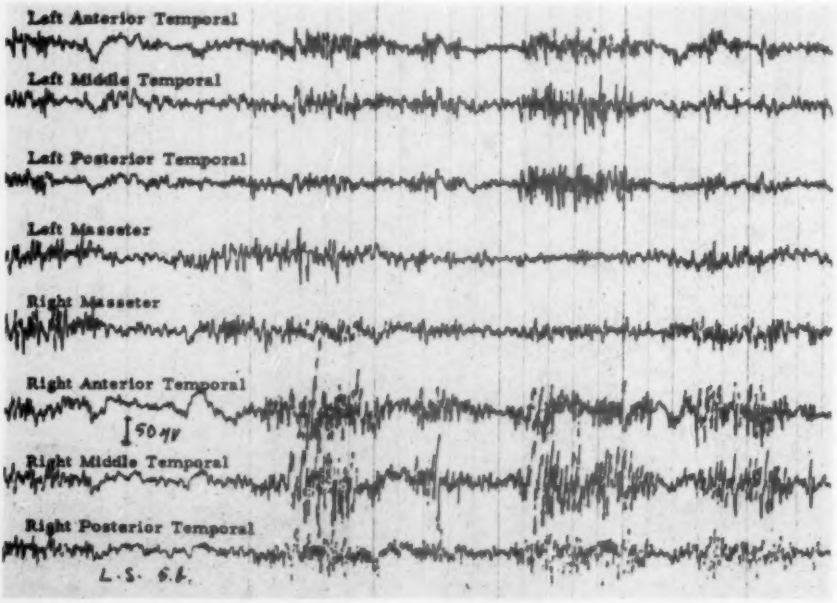


Fig. 19 • Spastic unharmonious muscle contractions in swallowing after inadequate occlusal adjustment. The patient still had a very minor "slide in centric" on the right side, otherwise excellent occlusal relations (fast speed)

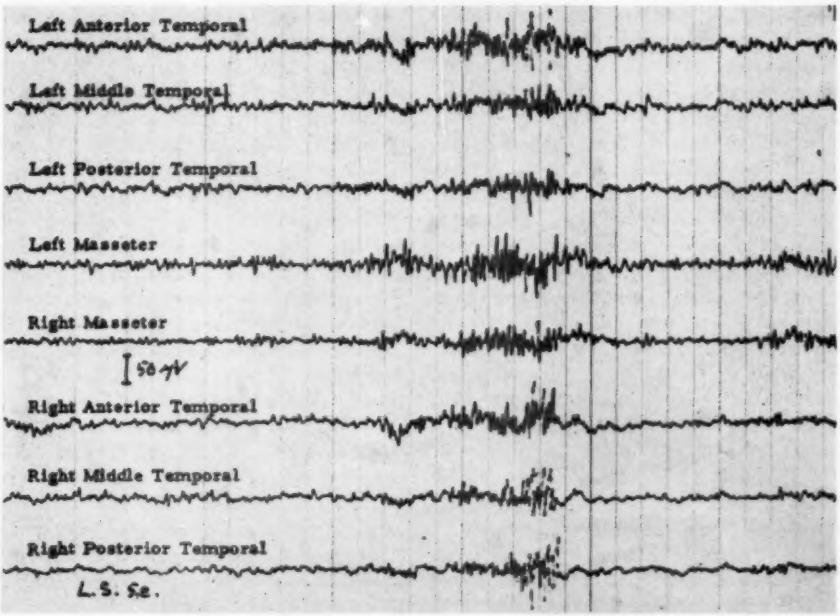


Fig. 20 • Swallowing after completed occlusal adjustment. Same patient as Figure 19. Note harmonious muscle activity (fast speed)

corrected, her bruxism subsided and a well-balanced electromyographic recording of swallowing was obtained (Fig. 20). Obviously, this does not mean that every patient with "slide in centric" will develop bruxism, since it is known that most individuals have such a "slide" without having bruxism; but it indicates that for patients with bruxism, temporomandibular joint discomfort or pain, it is extremely important to establish a stable centric relation. However, bruxism may be eliminated, at least temporarily, without a complete elimination of a "slide in centric" as seen in one of the patients in this study; but in such patients there is a great tendency for periodic bruxism associated with increased psychic tension and lowering of the irritability threshold of the neurons.

Centric relation is, by definition, a terminal jaw position. The fact that it takes some muscle action to bring the jaw into this position is well known from previous investigations.[38,47] It was interesting to note that only in two patients could it be ascertained electromyographically that the "slide in centric" disturbed masticatory pattern, whereas this slide disturbed the swallowing pattern in all of the patients. It seems, therefore, that a "slide in centric" is of much greater significance in swallowing than in mastication.

Occlusal Interference in Lateral Excursions • Occlusal interferences which triggered muscle spasms were observed in the various lateral excursions; but by far the most severe disturbances, electromyographically and clinically, were found associated with interferences on the balancing side. However, during the course of treatment, the bruxism persisted in

one person, who at that time had clinical and electromyographic evidence of perfect occlusal relations in centric and balance. His only occlusal interference was a heavy contact on the working side on a maxillary cuspid. When this interference was eliminated, and the bicuspids and molars were brought into contact in the lateral excursion, his bruxism stopped. This, of course, contradicts the current theories on the "cuspid rise."[51] In other cases, isolated balancing interference was responsible for continuation of bruxism during the treatment. It can, therefore, be stated that any type of occlusal interference may trigger bruxism, but centric and balancing interferences are more apt to be responsible for the bruxism than working side or protrusive interferences.

Occlusal Interference in Mastication • It was found, as reported several years ago by Beyron,[52] that the habitual masticatory pattern could be changed from unilateral to bilateral by occlusal adjustment. Several patients volunteered unsolicited information about noticing suddenly that they were chewing on both sides of their mouth after the adjustment. The electromyographic recordings confirmed the clinical impression of harmonious muscle coordination in bilateral mastication after occlusal adjustment. However, the masticatory movements were unreliable as an indicator of occlusal interferences of significance for the bruxism. Several patients had established excellent functional relations between their teeth in spite of the occlusal interference that acted as a trigger factor for the bruxism.

Significance of Rest Position and Freeway Space • Several patients had a perfectly balanced tonus activity in rest position in spite of severe occlusal interferences and bruxism. It seems that muscle balance in rest position has been given far too much significance in previous publications.[53-55] Even more misleading are statements about complete absence of muscle activity in rest position. Antigravity tonus and posture can only be maintained through muscle action. Tonus activity of the muscles may be manipulated in several ways that have been discussed previously and the muscle memory of occlusal interference seems to be short in the absence of pain. The influence of pain on the contraction pattern of the muscles will not be discussed in this paper. No attempt was made to measure the freeway space in these patients since it has been observed over the years (and confirmed in this study) that bruxism may be eliminated by occlusal adjustment regardless of the width of the freeway space.

Evaluation of the Electromyographic Technic • The electromyograph is a complicated tool with many possibilities, and some definite limitations. Reports on its usefulness in dental research have varied from uncritical enthusiasm to shoulder-shrugging negative criticism. New developments in dental electromyography[56-59] that appeared in the literature during the conduct of this study were considered and used experimentally. However, they were not adopted for the following reasons: The oscilloscope with its wide and sensitive range was not practical for study of occlusal contact relations because of a masking of the "spikes" on the screen. The question about placement of reference electrodes did not seem very pertinent to this investigation since the main concern was a comparison between identically recorded findings. Quantitation, either by integration units,[58] or measuring and counting of action potentials[60] (of questionable value after the use of surface electrodes) was found not to be indicated since the differences in action potentials of interest to this study were clear cut and obvious.

It should be emphasized that a very close co-ordination was observed between the clinical evidence of occlusal interfer-

ence and the electromyographic recordings of disturbances in the contraction pattern of the temporal and masseter muscles. Properly used, the electromyograph was extremely sensitive in detection of occlusal disharmonies.

SUMMARY

A combined clinical and electromyographic study of bruxism in 34 adults, before and after occlusal adjustment, has been reported. The neuromuscular mechanism of bruxism has been explained on the basis of an intimate relationship between occlusal interference and psychic tension. Occlusal interference in any jaw position could act as a trigger for bruxism, if combined with nervous tension. However, the most common occlusal factor in bruxism was found to be a discrepancy between centric relation (the terminal jaw position) and centric occlusion (maximal occlusal contact position). The second significant occlusal trigger factor was heavy balancing side contact.

It was demonstrated electromyographically that a discrepancy between centric relation and centric occlusion was accompanied invariably by asynchronous contractions or sustained strain in the temporal and masseter muscles during swallowing. A normal muscle balance in swallowing could be attained only when the occlusion was adjusted to a stable occlusal contact in centric relation.

Electromyographic evidence of muscle harmony in rest position and centric occlusion was found in several individuals with occlusal interferences and disturbed contraction pattern of the muscles in other positions.

Consistent correlation was observed between the occlusal interferences and the electromyographic recordings.

According to all available information, the bruxism in any excursion was eliminated after complete occlusal adjustment in all of the patients. However, an occasional tendency to clench the jaws in centric persisted in three patients, and two patients had a slight relapse of the bruxism when they developed new occlusal interferences.

CONCLUSIONS

1. Any type of occlusal interference may, when combined with nervous tension, initiate bruxism.

2. Bruxism may be eliminated by occlusal adjustments.

3. The occlusion has to be adjusted to centric relation in order to achieve muscle balance in patients with bruxism.

4. All studies of occlusal relationships are inadequate and inconclusive unless centric relation and swallowing are included.

5. The electromyograph is a sensitive and helpful tool for recording of occlusal interferences, but electromyographic records of a balanced muscle pattern in rest position and centric occlusion are not acceptable as evidence of an ideal, well balanced occlusion.

Presented as part of the Forum on Occlusion and Periodontics Session II, American Dental Association Centennial Session, New York, September 16, 1959.

This investigation was supported by the Research and Development Division, Office of the Surgeon General, Department of the Army, Washington, D. C. under Contract No. DA-49-007-MD-721.

*Professor of periodontics, University of Michigan School of Dentistry.

1. Marie and Pietkiewicz. La bruxomanie. Rev. de Stomat. 14:107 March 1907.

2. Frohman, B. S. The application of psychotherapy to dental problems. D. Cosmos 73:1117 Nov. 1931.

3. Miller, Samuel C. Oral diagnosis and treatment planning. Philadelphia, The Blakiston Co., 1936.

4. Karolyi, M. Zur Therapie der Erkrankungen der Mundschleimhaut. Vierteljschr. Zahnhk. 22:226, 1906.

5. Thielemann, Konrad. Biomechanik der Paradentose. Leipzig, Hermann Meusser, 1938.

6. Tishler, B. Occlusal habit neuroses. D. Cosmos 70:690 July 1928.

7. Nadler, S. C. Bruxism, a classification: critical review. J.A.D.A. 54:615 May 1957.

8. Boyens, P. J. Value of autosuggestion in the therapy of "bruxism" and other biting habits. J.A.D.A. 27:1773 Nov. 1940.

9. Peterson, L. N., and Dunkin, R. T. The incidence of bruxism in adults. Acad. Rev. 4:79 July 1956.

10. Bober, H. Grundlagen der Therapie der Hauptformen des (nachtlichen) Zahneknirschens. Österr. Zschr. Stomat. 52:449 Sept. 1955.

11. Karolyi, M. Beobachtungen über Pyorrhöe Alveolaris. Vierteljschr. Zahnhk. 17:279, 1901.

12. Karolyi, M. Beobachtungen über Pyorrhöe Alveolaris and Caries Dentium. Vierteljschr. Zahnhk. 18:520, 1902.

13. Karolyi, M. Ueber Alveolarpyorrhöe. Vierteljschr. Zahnhk. 21:85, 1906.

14. Eschler, J. Elektrophysiologische und pathologische Untersuchungen des Kausystems. Deut. Zahnärztl. Zschr. 7:1333, 1952.

15. Moore, D. S. Bruxism, diagnosis and treatment. J. Periodont. 27:277 Oct. 1956.

16. Gottlieb, B. Traumatic occlusion and the rest position of the mandible. J. Periodont. 18:7 Jan. 1947.

17. Leof, M. Clamping and grinding habits; their relation to periodontal disease. J.A.D.A. 31:184 Feb. 1944.

18. Miller, S. C., and Firestone, J. M. Psychosomatic factors in the etiology of periodontal disease. Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.) 33:675 Sept. 1947.

19. Lande, J. S. Psychosomatics in relation to periodontics. J. Periodont. 27:209 July 1956.

20. Sorrin, S. Habit: an etiologic factor of periodontal disease. D. Digest 41:290 Sept. 1935.

21. Ingle, J. I. Occupational bruxism and its relation to periodontal disease. J. Periodont. 23:7 Jan. 1952.

22. Goldhaber, Paul, and Goldberg, H. Extreme occlusal wear in a young adult. J. Periodont. 25:50 Jan. 1952.

23. Jankelson, B. Physiology of human dental occlusion. J.A.D.A. 50:664 June 1955.

24. Hirt, H. A., and Mühlemann, H. R. Diagnosis of bruxism by measurement of the tooth mobility. D. Abs. 1:356 June 1956.

25. Matthews, E. A treatment for the teeth-grinding habit. D. Rec. 62:154 June 1942.

26. Ingersoll, W. B., and Kerens, E. G. A treatment for excessive occlusal trauma or bruxism. J.A.D.A. 44:22 Jan. 1952.

27. Strother, E. W., and Mitchell, G. E. Bruxism: a review and a case report. J. D. Med. 9:189 Oct. 1954.

28. Stahl, D. G. A simplified procedure for fabricating a temporary removable acrylic bite plate. J. Periodont. 27:118 April 1956.

29. Perlow, J. Bruxism: treatment of a case. D. Digest 64:434 Oct. 1958.

30. Grupe, H. E., and Gromek, J. J. Bruxism splint. Technique using quick cure acrylic. J. Periodont. 30:156 April 1959.

31. Grewcock, R. J. G.; Thompson, H., and Thompson, A. R. F. Occlusal equilibration in general practice. D. Pract. & D. Rec. 5:313 May 1955.

32. Ross, I. F. The effects of tensional clenching upon the structures of the neck. J. Periodont. 25:46 Jan. 1954.

33. Gelberd, M. B. Treatment of bruxism. A case report. J. Hypnosis & Psychol. in Den. 1:18 Jan. 1958.

34. Chasins, A. I. Methocarbamal (robaxin) as an adjunct in the treatment of bruxism. J. D. Med. 14:166 July 1959.

35. Goldstein, M. A clinical investigation of mephate in dentistry. D. Digest 62:454 Oct.; 498 Nov. 1956.

36. Moyers, R. E. Temporomandibular muscle contraction patterns in Angle class II, division I malocclusions: an electromyographic analysis. Am. J. Orthodont. 35:837 Nov. 1949.

37. Moyers, R. E. An electromyographic analysis of certain muscles involved in temporomandibular movement. Am. J. Orthodont. 36:481 July 1950.

38. Moyers, R. E. Some physiologic considerations of centric and other jaw relations. J. Pros. Den. 6:183 March 1956.

39. Moyers, R. E. Some recent electromyographic findings in the oro-facial muscles. European Orthodont. Soc. Tr. 32:225, 1956.

40. Pruzansky, S. The application of electromyography to dental research. J.A.D.A. 44:49 Jan. 1952.

41. Jarabak, J. R. The adaptability of the temporal and masseter muscles; an electromyographical study. Angle Orthodont. 24:193 Oct. 1954.

42. Academy of denture prosthetics. Nomenclature committee. Glossary of prosthodontic terms. J. Pros. Den. March 1956. Supplement.

43. Perry, H. T., and Harris, S. C. Role of the neuromuscular system in functional activity of the mandible. J.A.D.A. 48:665 June 1954.

44. Perry, H. T., Jr. Functional electromyography of the temporal and masseter muscles in class II, division I malocclusion and excellent occlusion. Angle Orthodont. 25:49 Jan. 1955.

45. Pruzansky, S. Electromyographic measurement of the function of the muscles of mastication in man. Proc. Inst. Med. 19:315, 1953.

46. Jarabak, J. R. An electromyographic analysis of muscular and temporomandibular joint disturbances due to imbalances in occlusion. Angle Orthodont. 26:170 July 1956.

47. Greenfield, B. E., and Wyke, B. D. Electromyographic studies of some of the muscles of mastication. Brit. D. J. 100:129 March 6, 1956.

48. Jankelson, B.; Hoffman, G. M., and Hendron, J. A. The physiology of the stomatognathic system. J.A.D.A. 46:375 April 1953.

49. Rix, R. E. Deglutition and the teeth. D. J. Australia 18:488 Sept.-Oct. 1946.

50. Tulley, W. J. Muscles and the teeth. Proc. Roy. Soc. Med., Sec. Odont. 50:313 May 1957.

51. D'Amico, Angelo. Canine teeth—normal functional relation of the natural teeth of man. J. South. Calif. D. A. 26:6 Jan.; 49 Feb.; 127 April; 175 May; 194 June; 239 July 1958.

52. Beyron, H. Studier av ocklusala förändringer i det adulta bettet. Sven. Tandlak. Tskr. 45:119 May 1952.

53. Shpuntoff, H., and Shpuntoff, W. A study of physiologic rest position and centric position by electromyography. J. Pros. Den. 6:621 Sept. 1956.

54. Perry, H. T., Jr. Muscular changes associated with temporomandibular joint dysfunction. J.A.D.A. 54:644 May 1957.

55. Jarabak, F. R. An electromyographic analysis of muscular behavior in mandibular movements from rest position. J. Pros. Den. 7:682 Sept. 1957.

56. Latif, A. An electromyographic study of the temporalis muscle in normal persons during selected positions and movements of the mandible. Am. J. Orthodont. 43:577 Aug. 1957.

57. Hickey, J. C., and others. Electromyography in dental research. Part I. Geometric placement of reference electrodes. J. Pros. Den. 8:351 March 1958.

58. Pruzansky, S. Quantitative electromyographic analysis of mastication. Am. J. Orthodont. 44:307 April 1958.

59. Hickey, J. C., and others. Electromyography in dental research. Part II. Frequency response requirements. J. Pros. Den. 8:1049 Nov.-Dec. 1958.

60. Parks, J. L. An electromyographic and mechanical analysis of selected abdominal exercises. Thesis. University of Michigan, 1959.

Second revision of American Dental Association Specification No. 4 for Dental Inlay Casting Wax

John W. Stanford, M.S.; Keith V. Weigel,* and George C. Paffenbarger,* D.D.S., Washington, D. C.*

Revisions of the American Dental Association specifications for dental materials are usually made as test methods, materials and uses are developed. The "Procedure for Formulating and Revising American Dental Association Specifications" is given in *American Dental Association Specifications for Dental Materials 1960-1961*.[1] Usually a subcommittee of the Specifications Committee of the Dental Materials Group (International Association for Dental Research) is given the task of revising or formulating a specification. This tentative revision or formulation serves as the basis for the various steps involved in processing a specification to completion. The subcommittee involved in the revision of the American Dental Association Specification No. 4 for Inlay Casting Wax included George C. Paffenbarger, senior research associate, American Dental Association Research Division, National Bureau of Standards, Washington, D. C., chairman; William H. Crawford, dean, School of Dentistry, University of Minnesota, Minneapolis; William F. Talbot, formerly vice-president for research, Kerr Manufacturing Company, Detroit; J. R. Reasonberg, chief, research and development, Mizzy, Inc., Clifton Forge, Va.; Frank J. Demsko, chief chemist, The S. S. White Dental Manufacturing Company, Prince Bay, Staten Island, N. Y.; and John W. Stanford, research associate, American Dental Association Research Division, National Bureau of Standards, Washington, D. C., secretary.

INTRODUCTION

Since the American Dental Association specification for inlay casting wax was first revised in 1941,[2] there have been requests that requirements for inlay wax used in indirect technics should be added to the specification. This second revision was occasioned by these suggestions and by refinements in test procedures for determining flow, residue upon volatilization and linear thermal expansion of the wax.

Data on which the second revision is based were obtained from a recent survey of the five brands of certified inlay casting waxes appearing on the List of Certified Dental Materials[3] and on tests conducted on four brands of soft inlay waxes that have a greater flow at 37°C. (98.6°F.) than do the certified waxes that are for direct use in the mouth.

EXPERIMENTAL PROCEDURES

The first revision[1] of American Dental Association Specification No. 4 for Dental Inlay Casting Wax required the testing for flow at four temperatures, namely,

Table 1 • Flow of inlay casting waxes

Type I (Direct wax)	25°C.	30°C.	37°C.	37.5°C.	38°C.	40°C.	42°C.	43°C.	45°C.
	%	%	%	%	%	%	%	%	%
A	—	—	0.3	0.4	1.2	15.4	65.4	70.4	77.2
B	—	—	0.4	0.5	0.7	2.0	32.2	58.1	76.5
C	—	—	0.4	0.5	0.4	1.4	23.6	55.0	75.1
D	—	—	0.4	0.8	1.2	2.1	51.0	62.2	75.3
E	—	—	0.3	0.4	1.0	2.3	31.8	56.0	74.5
Type II (Indirect wax)									
F	0.2	0.2	12.0	—	51.2	77.4	81.8	83.3	85.2
G	0.2	0.2	2.1	—	8.0	55.2	72.0	79.0	80.1
H	0.2	0.2	2.2	—	8.1	54.1	71.8	77.7	79.0
I	0.3	0.4	5.4	—	49.5	66.2	72.3	76.5	83.1

37.5°C. (99.5°F.), 38.0°C. (100.4°F.), 42.0°C. (107.6°F.), and 43.0°C. (109.4° F.). During the testing of the waxes for the present revision, five additional testing temperatures were used. They were 25.0°C. (77.0°F.), 30.0°C. (86.0°F.), 37.0°C. (98.6°F.), 40.0°C. (104.0°F.), and 45.0°C. (113.0°F.). The purpose of this was to determine the flow characteristics of the five certified or hard waxes (Type I) and four soft waxes (Type II) at sufficient points to be able to distinguish them on the basis of flow. The procedure used to prepare and test the flow specimens followed as closely as possible the methods outlined for flow requirements in the second revision of American Dental Association Specification No. 3 for Dental Impression Compound;[4] it is given in paragraph 4.3.1 of the specification appended to this article.

The testing procedure for determining residue on volatilization of the wax has not been described previously. A known weight of wax is volatized at 500°C. (932°F.) (section 4.3.3); a maximum value for per cent residue is specified.

Detailed methods for determining linear thermal expansion of the waxes are also included (section 4.3.2); maximum values for linear expansion from 25.0°C. (77.0° F.) to 30.0°C. (86.0°F.) and from 25.0°C. (77.0°F.) to 37.0°C. (98.6°F.) are specified for the direct technic (Type I) inlay wax.

RESULTS

Table 1 presents the data obtained on the average flow of the waxes using duplicate specimens at each temperature. The data show that three testing temperatures, instead of the four required in the first revision of the specification, are sufficient to characterize flow of the waxes. For the Type I wax used in direct technics, 37.0°C., 40.0°C. and 45.0°C. were chosen as testing temperatures, whereas 30.0°C., 40.0°C. and 45.0°C. were chosen for the Type II wax. The results in Table 1 show that the Type I waxes have less than 1 per cent flow at 37.0°C. and that the Type II waxes have less than 1 per cent flow at 30.0°C. under the test conditions. Flow of the Type II waxes was determined at lower than mouth temperature since the indirect wax is used at room temperature. Since there were no important differences in the flow at 25.0°C. and 30.0°C., the 30.0°C. testing temperature was chosen. The 40.0°C. point was chosen to differentiate between

the types. The hard (Type I) waxes have less than 20 per cent flow and the soft (Type II) waxes have more than 50 per cent flow at 40.0°C. The same maximum and minimum values for flow, 90 and 70 per cent respectively, were set at 45.0°C. for both types of waxes to insure that the waxes had sufficient flow at elevated temperatures, yet would not melt at or below 45.0°C.

The residues in percentage of the original weights, after volatilization at 500°C. (932°F.) for one hour of all of the waxes were 0.00 per cent except for Type I, Samples A and E, which were 0.08 and 0.03 per cent, respectively. A maximum of 0.10 per cent residue was used in the specification revision. Because of the apparently successful use of the certified waxes in clinical practice, there does not appear to be any significant harm in 0.10 per cent residue during burnout of the wax pattern.

Table 2 contains the results of the linear thermal expansion measurements made on two specimens of each wax. Specimens were stored at 20.0 to 25.0°C. as well as at 37.0°C. for 24 hours and then linear thermal expansion was determined for the temperature range 25.0 to 30.0°C. (column a) and 25.0 to 37.0°C. (column c). After each determination the specimens were cooled in a water bath to 25.0°C.

After storage at 20.0 to 25.0°C. the results for linear expansion determined in the initial trial (column c) were significantly smaller than the results obtained on subsequent trials (column d). However, the values for replicates 2, 3 and 4 were in good agreement. On the other hand, the values obtained by the initial (columns a and c) and repeated trials (columns b and d) on specimens stored at 37.0°C. for 24 hours prior to testing agree very well. Table 2 shows that the average value of trials 2, 3 and 4 on specimens conditioned at 37.0°C. agrees well with the average of the same trials on specimens conditioned at 20.0 to 25.0°C. The initial trial on specimens conditioned at 37.0°C. (column c) also agrees with the average of trials 2, 3 and 4 on specimens conditioned at 20.0 to 25.0°C. (column d) for 24 hours prior to testing. Therefore the data in Table 2 indicate that the conditioning temperature of 37.0°C. apparently releases some of the strain induced into the specimens during preparation. The 37.0°C. conditioning

Table 2 • Linear thermal expansion of inlay casting waxes

Wax, direct type	Specimens stored at	Temperature range									
		25.0 to 30.0°C.					25.0 to 37.0°C.				
		a				b	c				d
	°C.	Run 1 %	Run 2 %	Run 3 %	Run 4 %	Average 2,3,4 %	Run 1 %	Run 2 %	Run 3 %	Run 4 %	Average 2,3,4 %
A	20–25	0.14	0.15	0.16	0.14	0.15	0.39	0.46	0.46	0.48	0.47
	37	0.15	0.16	0.18	0.15	0.16	0.48	0.52	0.48	0.50	0.50
B	20–25	0.12	0.13	0.14	0.12	0.13	0.30	0.34	0.36	0.32	0.34
	37	0.13	0.13	0.13	0.12	0.13	0.33	0.36	0.32	0.34	0.34
C	20–25	0.14	0.14	0.14	0.15	0.14	0.40	0.45	0.46	0.44	0.45
	37	0.14	0.14	0.14	0.14	0.14	0.44	0.44	0.44	0.43	0.44
D	20–25	0.07	0.13	0.14	0.13	0.13	0.24	0.46	0.46	0.43	0.45
	37	0.14	0.13	0.17	0.15	0.15	0.46	0.46	0.47	0.47	0.47
E	20–25	0.13	0.13	0.13	0.13	0.13	0.26	0.33	0.35	0.36	0.35
	37	0.14	0.14	0.14	0.14	0.14	0.41	0.41	0.41	0.41	0.41

temperature has thus been included in the thermal expansion test procedure in the second revision of the specification. In addition, maximum limits for linear thermal expansions of 0.2 per cent between 25.0 and 30.0°C. and 0.6 per cent between 25.0 and 37.0°C. have been included for the Type I (direct) wax. No requirements were set for the Type II (indirect) wax since it is not subjected in use to a temperature change from mouth-to-room temperature as is the Type I wax. The revised procedure for testing thermal expansion should lead to better agreement among testing laboratories.

SUMMARY

A revision of American Dental Association Specification No. 4 for Dental Inlay Casting Wax has been prepared to include provisions for a soft type of wax; that is, one used in indirect technics. Also more explicit testing procedures have been outlined for flow, residue on heating, and linear thermal expansion requirements. Maximum values for residue and linear thermal expansion of the waxes have been set.

*Research associates, American Dental Association, National Bureau of Standards.

1. Paffenbarger, G. C.; Stanford, J. W., and Sweeney, W. T. 1960-1961 American Dental Association specifications for dental materials. Chicago, American Dental Association, Jan. 1960.

2. Beall, J. R. Revision of American Dental Association specification no. 4 for inlay casting wax. J.A.D.A. 27:1140 July 1940.

3. List of certified dental materials, revised to May 1, 1959. J.A.D.A. 59:130 July 1959.

4. Stanford, J. W.; Paffenbarger, G. C., and Sweeney, W. T. A revision of American Dental Association specification no. 3 for dental impression compound. J.A.D.A. 51:56 July 1955.

AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 4 FOR DENTAL INLAY CASTING WAX

(Second revision, approved March 1960, effective July 1961)

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification is for inlay casting wax used in making patterns in the production of inlays and crowns. The wax consists essentially of natural waxes, resins and hydrocarbons of the paraffin series.

1.2 Types and classes. Inlay casting wax covered by this specification shall be of the following types and classes as specified:

Type I. Direct technic wax
- Class 1. Sticks
- Class 2. Cones

Type II. Indirect technic wax
- Class 1. Sticks
- Class 2. Cones

2. APPLICABLE SPECIFICATIONS

2.1 Specification. There are no other specifications applicable to this specification. (Copies of American Dental Association specifications may be obtained free upon application to the Council on Dental Research, American Dental Association, 222 E. Superior St., Chicago 11, or to the American Dental Association Research Division, National Bureau of Standards, Washington 25, D. C.)

3. REQUIREMENTS

3.1 Uniformity. The wax shall be uniform and free of foreign materials.

3.2 Size. Sizes shall be as specified by the purchaser.

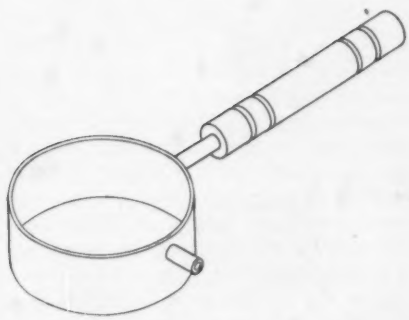


Fig. 1 • Metal pouring pan

3.3 Color. The color of the waxes shall be the color specified by the purchaser.

3.4 Softening. The wax shall soften without becoming flaky. It shall not show laminations when formed into a working mass.

3.5 Chipping. The wax shall not show appreciable chipping or flaking when trimmed to a fine margin at 20-25°C. (68-77°F.).

3.6 Residue. The melted wax when vaporized at 500°C. (932°F.) shall leave no solid residue in excess of 0.10 per cent of the original weight of the specimen when tested as described in 4.3.3.

3.7 Flow

3.7.1 Type I wax

3.7.1.1 The flow at 37°C. (98.6°F.) shall be not more than 1.0 per cent.

3.7.1.2 The flow at 40°C. (104.0°F.) shall be not more than 20 per cent.

3.7.1.3 The flow at 45°C. (113.0°F.) shall be not less than 70 nor more than 90 per cent.

3.7.2 Type II wax

3.7.2.1 The flow at 30°C. (86.0°F.) shall be not more than 1.0 per cent.

3.7.2.2 The flow at 40°C. (104.0°F.) shall be not less than 50 per cent.

3.7.2.3 The flow at 45°C. (113.0°F.) shall be not less than 70 nor more than 90 per cent.

3.8 Linear thermal expansion, Type I wax

3.8.1 The linear thermal expansion from 25.0°C. (77.0°F.) to 30.0°C. (86.0° F.) shall be not more than 0.2 per cent when tested as in 4.3.2.2.

3.8.2 The linear thermal expansion from 25.0°C. (77.0°F.) to 37.0°C. (98.6° F.) shall be not more than 0.6 per cent when tested as in 4.3.2.2.

3.9 Manufacturer's instructions. Instructions, including the method to be used for softening, working temperature and, for the Type I wax only, data showing the thermal expansion of the wax from 25.0°C. (77.0°F.) to 30.0°C. (86.0°F.) and to 37.0°C. (98.6°F.), shall be supplied with each package of wax.

4. SAMPLING, INSPECTION AND TESTING PROCEDURES

4.1 Sampling. Five packages or approximately five ounces of wax shall be procured at retail by a member of the American Dental Association. This sample shall be forwarded in the original, unopened package or packages to the American Dental Association Research Division at the National Bureau of Standards, Washington 25, D. C.

4.2 Inspection. Visual inspection shall be used in determining compliance with the requirements stated in 3.1, 3.3, 3.4, 3.5, 3.9 and 5.

4.3 Physical tests.

4.3.1 Flow

4.3.1.1 Preparation of specimens. A quantity of wax shall be broken into pieces and placed in a metal pouring pan such as illustrated in Figure 1. The pan shall be placed on a surface that is 130 mm. (5.1 in.) below a 250 watt infrared lamp. The wax, while being stirred, shall be allowed to reach a temperature of 75 ± 5°C. (167 ± 9°F.) and be maintained at this temperature until the sample is melted throughout. A thermometer shall be used to measure the temperature. The melted wax shall then be poured into a mold that has been lubri-

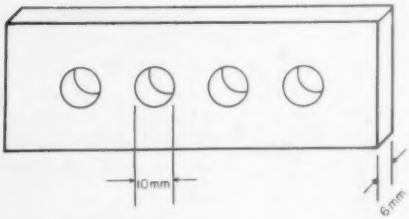


Fig. 2 • Mold for forming flow specimens

cated with a silicone grease whose melting point is higher than 75 ± 5°C. (167 ± 9°F.). The mold (Fig. 2), shall consist of a stainless steel plate 6.0 mm. (0.236 in.) thick, having flat, parallel top and bottom surfaces, and containing four holes 10.0 mm. (0.394 in.) in diameter. The axes of the holes shall be perpendicular to the surfaces of the plate. The sides of the holes shall be finished smooth. The mold shall be preheated to a temperature of 55 ± 5°C. (131 ± 9°F.) and placed on a smooth glass slab 152 mm. long, 76 mm. wide and 19 mm. thick (6 × 3 × 0.75 in.), preheated to the same temperature. As the wax freezes and a shrinkage void appears, liquid wax shall be added. When the wax has lost its "mirror-like" surface, a smooth, flat, tin-foil-or aluminum-foil-covered glass plate, preheated to 55 ± 5° C. (131 ± 9°F.), shall be placed on the top of the mold. A load of 9,000 Gm. (20 lb.) shall be applied to the top of the foil-covered glass plate for 30 minutes.

The weight and the glass plate shall then be removed and the excess wax trimmed away. This may be accomplished by drawing a metal scraper across the mold trimming the specimen flush with the surface. The mold shall be removed from the glass slab by gently tapping the side of the mold. The specimens of wax shall be removed from the mold by chilling in water at 10°C. (50°F.) and shall then be stored at 20-25°C. (68-77°F.) for 24 hours before testing.

4.3.1.2 Method of test. The initial length of the specimen shall be determined at 20-25°C. (68-77°F.) using a metric micrometer caliper. Four measurements shall be made around the circumference and one measurement shall be made in the center of the specimen. The measurements shall be averaged and recorded to the nearest 0.005 mm. The specimen and flow testing instrument shall be placed in a water bath and held at the testing temperature for 20 minutes prior to testing. The flow testing instrument (Fig. 3) consists of the following: A, a weight; B, a shaft having low thermal conductivity; C, a brass platen. The total weight, in air, of these three components shall be 2,000 Gm. (4.41 lb.). The weight, A, shall be separated a minimum distance of 76 mm. (3 in.) from the brass platen by the nonconducting shaft. This shaft shall be of hard rubber or a similarly poor thermal conductor to reduce loss of heat from the specimen. The diameter of the brass

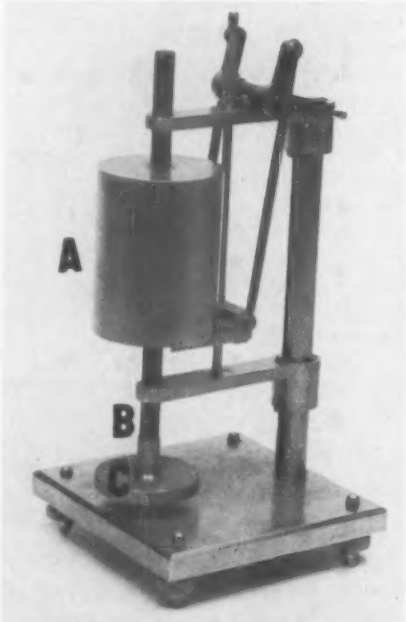


Fig. 3 • Flow testing instrument. A, weight; B, shaft; C, brass platen

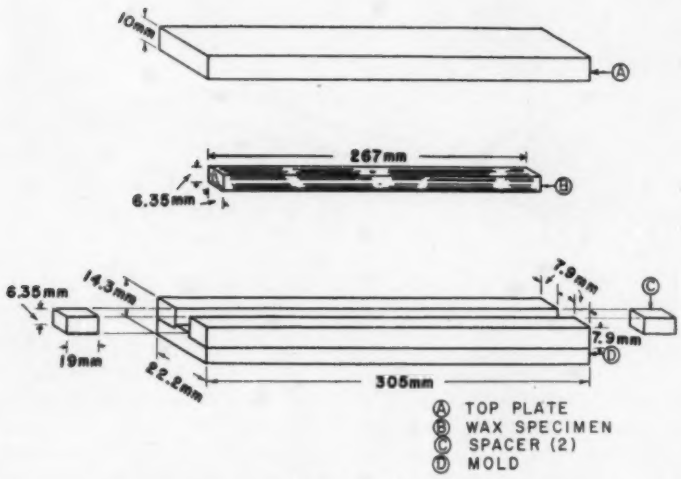


Fig. 4 • Mold for forming thermal expansion specimens

platen shall not be less than 51 mm. (2 in.). The thickness shall not exceed 6.35 mm. (0.25 in.). The temperature of the bath shall be controlled to within ± 0.1°C. (± 0.2°F.) of the required temperature. (A calibrated thermometer shall be used for determining the temperature.) Agitation shall be provided in the water bath by means of a mechanical stirrer. A thin sheet of waterproof cellophane shall be placed between the instrument and each end of the specimen. The bottom of the specimen shall be 51 mm. (2 in.) below the surface of the water in the bath. A constant axial load of 2,000 Gm. (4.41 lb.) shall then be applied to the specimen for ten minutes, after which the specimen shall be removed and cooled in air to 20-25°C. (68-77°F.). The cellophane shall be stripped off and the final length determined in the same manner as the original length. The flow, as evidenced by the change in length, shall be reported as percentage of the initial length. The value for flow at any temperature shall be the average value for two specimens and shall be reported to the nearest 0.1 per cent.

4.3.2 Linear thermal expansion

4.3.2.1 Preparation of specimens. The wax shall be melted as described in 4.3.1.1, and shall be poured into a brass mold, lubricated with a silicone grease whose melting point is higher than 75 ± 5°C. (167 ± 9°F.) (Fig. 4), and having an opening of 6.35 × 6.35 mm. (0.25 × 0.25 in.) running the length of the mold, until the mold is overfilled. Spacers, 19 mm. (0.75 in.) in length, shall be placed in the opening at each end of the mold (Fig. 4, C). The mold shall be preheated to 55 ± 5°C. (131 ± 9°F.). As the wax freezes and shrinkage occurs, liquid wax shall be added. When the wax has lost its "mirror-like" surface, a lubricated brass plate preheated to 55 ± 5°C. (131 ± 9°F.) shall be placed on top of the overfilled mold. A load of 9,000 Gm. (20 lb.) shall be applied to the top of the brass plate for 30 minutes. The weight and brass plate shall then be removed and the excess wax trimmed away until the specimen is flush with the top of the mold. The size of the specimen thus prepared will be approximately 267 × 6.35 × 6.35 mm. (10.5 × 0.25 ×

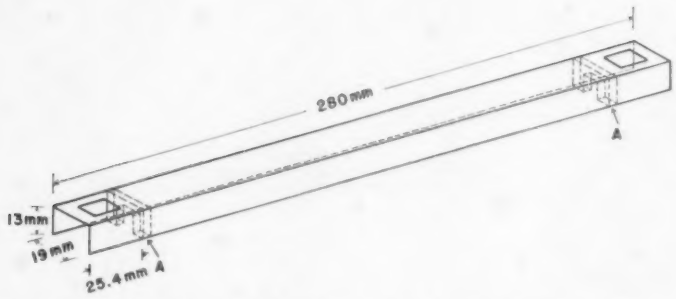


Fig. 5 • Holder for thermal expansion specimen

0.25 in.) and is suitable for use with the micrometer microscope comparator (4.3.2.2). The specimen shall be removed from the mold and shall have embedded in its surface near each end, small metal pins having crossmarks which shall serve as reference marks for subsequent linear measurements. After the test specimen is prepared, it shall be stored at 37°C. (98.6°F.) for 24 hours before testing.

4.3.2.2 Method of test. The specimen shall be heated to three different temperatures and the distance between the reference marks shall be determined at each temperature. A micrometer microscope comparator or equipment of equal accuracy shall be used to make the measurements. The specimen shall be placed under a suitable holder with openings for viewing the reference marks as shown in Figure 5. The openings shall be located 6.35 mm. (0.25 in.) from each end of the holder and shall be 9.52 × 12.7 mm. (0.375 × 0.5 in.) in size. The holder shall be so constructed that the wax specimen shall ride against only two narrowed sections, having 7.94 × 7.94 mm. (0.312 × 0.312 in.) openings (Fig. 5,A), located 25.4 mm. (1.0 in.) from each end, to enable alignment but a minimum of restraint to the expansion during heating. An initial measurement on the specimen previously conditioned at 37°C. shall be made in water after 20 minutes at 25.0 ± 0.1°C. (77.0 ± 0.2°F.). The temperature shall then be raised in the water bath to 30.0 ± 0.1°C. (86.0 ± 0.2°F.) at a rate of approximately 1-2°C. per minute. The specimen shall remain 20 minutes at that temperature before the distance between marks is determined. The temperature shall then be raised to 37.0 ± 0.1°C. (98.6 ± 0.2°F.), and after 20 minutes at that temperature the distance between the marks shall be determined. A repeat test starting at 25.0 ± 0.1°C. (77.0 ± 2° F.) shall be made on the same specimen. Using the 25.0 ± 0.1°C. (77.0 ± 0.2°F.) length measurement as the base, the value for linear thermal expansion shall be the average value of the two determinations at each temperature and shall be reported to the nearest 0.05 per cent.

4.3.3 Residue. Approximately 1 Gm. of wax shall be placed in a crucible previously conditioned to constant weight by repeated heatings to 500°C. (932.°F.) and cooling to 20-25°C. (68-77°F.). The conditioned, tared and loaded crucible shall be transferred to a furnace at 20-25°C. (68-77°F.). The temperature of the furnace shall be increased to 500°C. (932°F.) and maintained at this temperature for one hour. The crucible shall then be removed from the furnace, placed in a desiccator, and allowed to cool to 20-25°C. (68-77°F.) before weighing. The value for residue shall be the average value of two determinations and shall be reported to the nearest 0.02 per cent.

5. PREPARATION FOR DELIVERY

5.1 Packaging. The material shall be packaged in accordance with accepted commercial practice.

5.2 Marking

5.2.1 Lot numbers. Each container shall be marked with a serial number or a combination of letters and numbers which refer to the manufacturer's records for the particular lot or batch of wax.

5.2.2 Date of manufacture. The date of manufacture (year and month) shall be given on the container either as a separate item or as part of the lot number (5.2.1).

5.2.3 Net weight. The minimum net weight of the contents shall be indicated on all containers.

5.2.4 Type and class. The type and class (1.2) of wax shall be indicated on all containers.

6. NOTES

6.1 Intended use. The usual uses for the two types of waxes specified are: Type I, direct technic wax, the wax being suitable for making patterns in or out of the oral cavity for the production of inlays and crowns; Type II, indirect technic wax, the wax being suitable for making patterns outside the oral cavity for the production of inlays and crowns.

6.2 Reference. The following references will assist the observer in the testing of inlay casting wax for compliance with this specification:

Taylor, N. O.; Sweeney, W. T.; and Paffenbarger, G. C. Specification for inlay casting wax. J.A.D.A. 18:40 Jan. 1931.

Beall, J. R. Revision of American Dental Association Specification No. 4 for inlay casting wax. J.A.D.A. 27:1140 July 1940.

Conservatism of Modern Science • Either the structure of the universe is indeed of such a nature that it cannot be comprehended in terms of human space and time, human reason and human imagination, or exact science has ceased to be the philosophy of nature, and no longer has much inspiration to offer to the questing human mind. In this case it would be legitimate for the scientist to withdraw into his closed system, to manipulate his purely formal symbols and to evade questions concerning the "real meaning" of these symbols. . . . He must accept his role as a mere technician whose task is to produce better bombs and plastic fibers instead of more elegant systems of epicycles to save the phenomena. The present crisis in science may be regarded as a temporary phenomenon, the result of a one-sided, overspecialized development . . . of mental evolution which we have so often observed in the past. But if that is the case, where on the three centuries' journey from "natural philosophy" to "exact science" did the estrangement from reality begin? . . . "We are indeed a blind race," wrote a contemporary scientist, "and the next generation, blind to its own blindness, will be amazed at ours." *Arthur Koestler. The Sleepwalkers, 1959.*

Psychological evaluation of hypnosis in dentistry

Loren R. Borland, D.D.S., and Sidney Epstein,† D.D.S.,*
San Francisco

In this study of the personality characteristics of dentists who employ hypnosis in their practice, the subjects consisted of 34 dentists, half of whom practiced hypnosis and half of whom did not. Interviews with each were tape recorded. The tapes were edited so that no information as to the use or nonuse of hypnosis remained on the tapes. The tapes were then audited by two psychologists and each subject was rated by the Q-sort technic. Then, by a "cluster analysis" mathematical technic, the 34 subjects were put into five groups of people. All subjects also filled out the California Psychological Inventory. The results indicated that most well-adjusted dentists do not tend to use hypnosis.

Dentists are constantly seeking means of making dental treatment more acceptable, less threatening, and more comfortable for the patient. Armamentaria have been developed that make possible rapid, effective, restorative procedures. Anesthetics of high potency, rapid onset and low toxicity are available for routine use to control or prevent pain or other noxious stimulation. The physical environment of the operatory has also been planned to create a place in which the patient may find comfort and a state of well-being.

Despite all of these advances, for some people dental treatment carries with it so many unpleasant connotations that only a more threatening danger compels them to seek and accept minimal treatment. It is, in part, an awareness of this group that has prompted dentists to continue to seek other methods of treatment. During the past decade, there has been an impressive increased interest in hypnosis, suggestion and "relaxation technics." Dentists have been among the leaders in founding groups for the study of clinical and experimental hypnosis.

There has been a notable increase in the amount of journal space devoted to articles dealing with these topics. Programs of dental societies are giving more time to essays and discussions of the subject. New books appear with some regularity. "Seminars" on hypnosis, presented by private individuals or groups, have been highly successful, at least from the standpoint of initial interest and attendance. One dental school has included instruction in the technic of hypnosis in its postgraduate curriculum. Several extension courses on the subject have been offered by universities.

It is not the purpose of this paper to review the history of the use of hypnosis in various aspects of medical treatment. Suffice it to point out that hypnotism undoubtedly was used in the sleep temples of ancient Egypt. Hippocrates, the father of modern medicine, spoke of it when he

said, "The soul sees quite well with shut eyes the affections suffered by the body." However, it was not until 1774 that hypnosis was heard of in Europe.

Franz Anton Mesmer, a Viennese physician, reported on the use of the phenomenon in the treatment of patients. His efforts failed to gain notable success. In England, in 1843, John Elliotson experimented with mesmerism. James Braid studied mesmerism and found he could induce the trancelike state by fixed gazing rather than the use of Mesmer's magnet. In his writings of 1843, he coined the word "hypnotism." James Esdaile, a Scottish surgeon in India, reported on a significant number of major and minor operations with noticeably reduced mortality when hypnosis was used.

In France, Liebeault, Bernheim, and Charcot did extensive studies. It was to this group that Freud went for his training after witnessing its effect in the treatment of hysterics. He ultimately pointed out its serious limitations and deficiencies. After the turn of the century, interest and controversy seemed to wane, except during the periods of the two World Wars when it was used to attempt rapid psychotherapy.

Since 1949, both in the United States and England, there has been interest and study given to the subject of hypnosis by authoritative groups. Within the specialty of dentistry there appears to be much activity. However, it is always difficult to determine whether such an apparent trend is really indicative of widespread interest or whether it is the result of a small but highly vocal group within the profession. Equally difficult to answer are questions pertaining to the nature of the interest felt by the men who read the books and papers and attend the "seminars." It is a desire to improve proficiency and capacity to perform dental treatment? Or is this a relatively detached and intellectual fascination which is satisfied by the acquisition of knowledge and understanding? Or is it an interest which can know satisfaction only when this knowledge and understanding is translated into application?

It begins to appear that ignorance of the nature of the phenomenon of hypnosis is equalled, if not exceeded, by lack of knowledge about the men who become so fascinated by the subject. There has been little evaluation of its practicability and efficiency as applied by its devotees. It was with this in mind that the section of psychology of the School of Dentistry, University of California, turned its attention away from the technic of hypnosis and its clinical application and undertook a study of the personality characteristics of the men who employ it in their practices.

The amount of attention given to hypnosis has increased sharply in the last ten years. Almost without exception, those dentists who have accepted hypnosis and have integrated it into their practices have spent a large amount of time and money attending commercial seminars in hypnosis. The application of hypnosis in dental treatment often becomes a time-consuming and economically dubious procedure. The difficulty experienced in locating enough dentists who admitted to the use of hypnosis to constitute a sample for this study seems to be ample evidence that these men constitute a very small minority, and that the vast majority of practicing dentists feel it is possible to render adequate service without employing hypnosis.

Why, then, are some dentists willing, if not actually eager, to devote effort and expense to the study and development of a technic which is regarded by the major portion of the dental profession as unnecessary and perhaps even undesirable? This question and our inability to answer it, except in the most hypothetical way, prompted the undertaking of this study.

We began by assuming that dentists who attempt to integrate hypnosis into busy dental practices must differ in some basic and important ways from dentists

who feel no interest in studying or applying these technics. We further assumed that these differences would be found in the area of personality characteristics and would most specifically have to do with the "need structures" of the dentists involved. We expected to find that the use of hypnosis by the dentist served the primary function of gratification of some of the dentist's needs, and only secondarily found justification in the effect of hypnosis on the patient and his dental treatment.

DESIGN OF STUDY

The design of the study was as follows: A list of persons who had taken the courses in hypnosis was obtained by circularizing the memberships of large metropolitan dental societies. We then wrote to those persons who were located in areas where we could conveniently contact them. This served as a first working definition for dentists who used hypnosis. Later this definition was modified to include only those individuals who openly stated that they used hypnosis in their practice. Individuals who stated that they did not use hypnosis or had given it up are not included in the group discussed here.

Having defined a group of hypnosis users, our next task was to find a group of dentists who did not use hypnosis who could be a control group for the hypnosis users. For each dentist who used hypnosis in his practice, an attempt was made to match him with one who had a similar practice, income, and geographic location and who did not use hypnosis.

Once the two groups of people were located and were willing to participate in the study, the procedure was as follows: A two-hour interview was arranged with each individual in which H. G. Gough's "Life History Interview Schedule" was utilized. The interview was standard for all subjects, covering such topics as childhood, relations with parents, adolescence, current functioning, education, professional career, future plans, problem areas, and so on. The purpose was to get a relatively complete picture of each individual by means of this interview. The interviews were done by a trained clinical psychologist, Mr. Curtis D. Hardyck. The interviews were usually done in the dentist's office and were tape recorded. After the life history interview, a second interview was done, during which the dentist was asked his views on hypnosis, the advantages and disadvantages of using it in dentistry, whether he would have it taught in medical and dental schools, and so on. This interview was kept separate from the earlier interview. After the interview the tape recording was examined and any information which might identify a particular dentist by name was removed from the recording. No information concerning whether the dentist used hypnosis or not was left on the tape recording. This procedure was carried out on 34 subjects.

The tape recording of the interview was then given to two other psychologists who listened to it and each made a series of ratings. It should be noted that the interviewer was the only person who knew whether the dentist used hypnosis. The other two psychologists worked independently of him and of each other and had no information concerning which dentists used hypnosis. Their task was solely to listen to the tape recording of an interview which followed a prescribed form and then to make a series of ratings which described this person as an individual.

The ratings or statements made about the persons in the study were evaluated in the following manner: The psychologists doing the ratings (the interviewer and two others) used a method of describing individuals which is known as the Q-sort. This consists of a set of 100 statements which can be used to describe an individual. These 100 statements are

placed in nine categories. These categories range from least to most descriptive of the individual, that is, category No. 1 contains those statements which are the most uncharacteristic for a given person, whereas category No. 9 contains those statements which are most characteristic for that person; for example, those statements which the raters felt best characterize him as an individual. The number of statements that can be placed in any category is a fixed number—exactly the same number of statements are placed in any category for any individual. The advantage of this procedure is that it is now possible to compare persons directly by means of this technic. A numerical value from 1 to 9 can be assigned to each statement, depending on the category in which it is placed, and the discrepancy between a given statement for two individuals can be stated precisely. When this is done over the entire set of 100 statements, it is possible to obtain a mathematical index indicating how alike or how different two given people are judged to be. Similarly, it is possible to find out for a group of 34 people, which people are most alike and which people are totally unlike each other.

Since the extent to which people are judged to be like or unlike each other can be stated in terms of a numerical value, it was possible to use mathematical methods to sort the 34 subjects in this study into groups. This is what was done with the data that were collected for this study. The ratings done by the psychologists were summarized and sent for processing by the IBM 701 computer on the Berkeley campus of the University of California. By means of a mathematical technic known as "cluster analysis," the 34 subjects were put into five groups of people. Once this was completed, a summation was made of the original group of statements which had been used to describe the individuals and a listing made of those statements which characterized the groups.

SUMMATION OF STATEMENTS

Following are some of the statements that were found to be most and least characteristic of the individuals in Group I.

Group I

Items most characteristic (in rank order)

Item	
72	Concerned with own adequacy as a person, either at conscious or unconscious levels (clinical judgment).
12	Tends to be self-defensive.
68	Is basically anxious.
19	Seeks reassurance from others.
47	Has a readiness to feel guilty (whether verbalized or not).
40	Is vulnerable to real or fancied threat, generally fearful.
86	Handles anxiety and conflict by, in effect, refusing to recognize their presence; repressive or disassociative tendencies.
9	Is uncomfortable with uncertainties and complexities.
14	Genuinely submissive; accepts domination comfortably.
38	Has hostility toward others. (Basic hostility meant here.)
63	Judges self and others in conventional terms like "popularity," "the correct thing to do," social pressures, and so on.
7	Favors conservative values in a variety of areas.
2	Is a genuinely dependable and responsible person.

Items least characteristic (in rank order)

Item	
60	Has insight into own motives and behavior.
94	Expresses hostile feelings directly.
62	Tends to be rebellious and nonconforming.
99	Is self-dramatizing, histrionic.
65	Characteristically pushes and tries to stretch limits; sees what he can get away with.
39	Thinks and associates to ideas in unusual ways; has unconventional thought processes.
50	Is unpredictable and changeable in behavior and attitudes.
32	Seems to be aware of the impression he makes on others.
15	Is skilled in social technics of imaginative play, pretending and humor ("the light touch" as compared to "the heavy touch").
37	Is guileful and deceitful, manipulative, opportunistic.

57 Is an interesting, arresting person.
83 Able to see to the heart of important problems.
52 Behaves in an assertive fashion (overt behavior).
67 Is self-indulgent.

Having seen what statements characterize this group, what may one say in summary about them? They would be described best, perhaps, as rather tense and anxious individuals who have trouble in establishing satisfactory relationships with others and who seem to expend much of their available energy in inner struggles and personal conflicts. They would tend to be seen as moody and probably often are seen as being sad or depressed. There are six people in Group I, three of whom are hypnosis users and three who are not.

Group II

Items most characteristic (in rank order).

Item
96 Values own independence and autonomy.
77 Appears straightforward, forthright, candid in dealings with others.
52 Behaves in an assertive fashion (overt behavior).
71 Has high aspiration level for self.
2 Is a genuinely dependable and responsible person.
5 Behaves in a giving way toward others.
26 Is productive; gets things done.
35 Has warmth; has the capacity for close relationships; compassionate.
11 Is protective of those close to him.
28 Tends to arouse liking and acceptance in people.
72 Concerned with own adequacy as a person.
17 Behaves in a sympathetic or considerate manner.
1 Is critical, skeptical, not easily impressed.

Items least characteristic (in rank order)

Item
69 Is sensitive to anything that can be construed as a demand.
22 Feels a lack of personal meaning in life.
55 Is self-defeating.
50 Is unpredictable and changeable in behavior and attitude.
30 Gives up and withdraws where possible in the face of frustration and adversity. (N.B. If placed high, implies generally defeatist; if placed low, implies counteractive.)
14 Genuinely submissive; accepts domination comfortably.
78 Feels cheated and victimized by life; self-pitying.
65 Characteristically pushes and tries to stretch limits; sees what he can get away with.
37 Is guileful and deceitful, manipulative, opportunistic.
62 Tends to be rebellious and nonconforming.
36 Is subtly negativistic; tends to undermine and obstruct or sabotage.
42 Reluctant to commit self to any definite course of action; tends to delay or avoid action.
97 Is emotionally bland; has flattened effect.

This group can be characterized easily by the general label of "well-adjusted." This is an independent, stable, and highly productive group of people. They are seen by others as responsive and likable. Very little of their energy seems to be expended in personal conflicts, and they possess the capacity to display warmth and regard for others without the anxiety which characterized the people in Group I. There are ten people in this group, none of whom use hypnosis in their practice.

Group III

Items most characteristic (in rank order)

Item
72 Concerned with own adequacy as a person.
12 Tends to be self-defensive.
48 Keeps people at a distance; avoids close interpersonal relationships.
91 Is power-oriented; values power in self or others.
9 Is uncomfortable with uncertainty and complexities.
59 Is concerned with own body and the adequacy of its physiological functioning.
89 Compares self to others. Is alert to real or fancied differences between self and other people.
61 Creates and exploits dependency in people.
7 Favors conservative values in a variety of areas.

84 Is cheerful.
49 Is basically distrustful of people in general; questions their motivations.
38 Has hostility toward others.
68 Is basically anxious.

Items least characteristic (in rank order)

Item
60 Has insight into own motives and behavior.
61 Has warmth; has the capacity for close relationships; compassionate.
16 Is introspective and concerned with self as an object.
83 Able to see to the heart of important problems.
39 Thinks and associates to ideas in unusual ways; has unconventional thought processes.
55 Is self-defeating.
62 Tends to be rebellious and nonconforming.
66 Enjoys esthetic impressions, is esthetically reactive.
32 Seems to be aware of the impression he makes on others.
15 Is skilled in social technics of imaginative play, pretending and humor ("the light touch" as compared to "the heavy touch").
21 Arouses nurturant feelings in others.
29 Is turned to for advice and reassurance.
64 Is socially perceptive of a wide range of interpersonal cues.
90 Is concerned with philosophical problems; for example, religions, values, the meaning of life, and so on.

This group tends to be oriented toward personal power and to be concerned with personal advancement above all, generally disregarding the feelings and wishes of others in their striving for advancement. These individuals dominate others through force and sheer energy. They literally force their way ahead through a combination of energy and a lack of consideration for the wishes of others. There are four individuals in this group, two who use hypnosis and two who do not.

Group IV bears some similarities to the other groups, and yet it is different in other ways.

Group IV
Items most characteristic (in rank order)

Item
67 Is self-indulgent.
72 Concerned with own adequacy as a person, either conscious or unconscious.
91 Is power-oriented; values power in self or others.
73 Tends to perceive many different contexts in sexual terms; eroticizes situations.
89 Compares self to others. Is alert to real or fancied differences between self and other people.
80 Interested in members of the opposite sex.
52 Behaves in an assertive fashion.
37 Is guileful and deceitful, manipulative, opportunistic.
19 Seeks reassurance from others.
58 Enjoys sensuous experiences (including touch, taste, smell, physical contact).
38 Has hostility toward others.
49 Is basically distrustful of people in general; questions their motivations.
54 Emphasizes being with others; gregarious.
96 Values own independence and autonomy.

Items least characteristic (in rank order)

Item
14 Genuinely submissive; accepts domination comfortably.
25 Tends toward overcontrol of needs and impulses; binds tensions excessively; delays gratification unnecessarily.
55 Is self-defeating.
60 Has insight into own motives and behavior.
39 Thinks and associates to ideas in unusual ways; has unconventional thought processes.
100 Does not vary roles; relates to everyone in the same way.
30 Gives up and withdraws where possible in the face of frustration and adversity. (If placed low, implies counteractive.)
22 Feels a lack of personal meaning in life.
45 Has a brittle ego-defense system; has a small reserve of integration; would be disorganized and maladaptive when under stress or trauma.
87 Interprets basically simple and clear-cut situations in complicated and particularizing ways.
78 Feels cheated and victimized by life; self-pitying.
29 Is turned to for advice and reassurance.
42 Reluctant to commit self to any definite course of action; delays.

This group can be described best as being shrewd and manipulative, having a good deal of skill at getting people to do what they want while concealing their own reasons. These also seem to be people who would not be particularly con-

cerned over the ethical and moral issues that might be raised over a given activity; these are people who feel very little guilt over whatever they might do; people for whom ethical considerations are almost nonexistent. The psychiatric term "psychopath" which originally meant a person with no moral or ethical sense could be applied to this group without too much hesitation. In Group IV there was an equal number (4) of users of hypnosis and nonusers.

Group V is a difficult group to describe. In one sense it is not really a definite group; it is composed of those individuals who were not clearly defined enough to include in other groups.

Group V

Items most characteristic (in rank order)

Item	
72	Concerned with own adequacy as a person, either at conscious or unconscious levels.
48	Keeps people at a distance; avoids close interpersonal relationships.
68	Is basically anxious.
38	Has hostility toward others.
16	Is introspective and concerned with self as an object.
2	Is a genuinely dependable and responsible person.
8	Appears to have a high degree of intellectual capacity.
52	Behaves in an assertive fashion.
69	Is sensitive to anything that can be construed as a demand.
41	Is moralistic.
12	Tends to be self-defensive.
26	Is productive; gets things done.
98	Is verbally fluent; can express ideas well.

Items least characteristic (in rank order)

Item	
94	Expresses hostile feelings directly.
21	Arouses nurturant feelings in others.
65	Characteristically pushes and tries to stretch limits; sees what he can get away with.
55	Is self-defeating.
62	Tends to be rebellious and nonconforming.
35	Has warmth; has the capacity for close relationships; compassionate.
30	Gives up and withdraws where possible in the face of frustration and adversity. (If placed low, implies counteractive.)
78	Feels cheated and victimized by life; self-pitying.
84	Is cheerful (extreme placement toward uncharacteristic end implies unhappiness or depression).
54	Emphasizes being with others; gregarious.
99	Is self-dramatizing; histrionic.
50	Is unpredictable and changeable in behavior and attitude.
14	Genuinely submissive; accepts domination comfortably.
42	Reluctant to commit self to any definite course of action; tends to avoid or delay action.

From the tabulation of items, it is difficult to arrive at a consistent picture for this group. They are people who have anxieties and problems such as those characterized for Group I, are striving in the fashion in which Group III was characterized, and display many of those positive, useful traits which characterize the largest group, Group II. Certainly, it can be said of these persons that they are difficult to describe. Perhaps if there was a clearer picture of them they would fall into one of the other groups. Of this group, four are hypnosis users and three are not.

All the information presented here was basically in the form of the summed judgments of three psychologists concerning the personality characteristics of the people in this study. Since it was believed advantageous to have some kind of independent estimate to check the psychologists against, all participants filled out the California Psychological Inventory, a questionnaire type of personality inventory. This inventory may be scored for a number of different characteristics, so the opinions of the judges can be checked by making predictions concerning what scales a given group should score especially high on. For example, Group I is described as being tense, anxious, as having trouble establishing satisfactory relationships with others and as being depressed. If the judgments of the psychologists are accurate, this group may be expected to have very low scores on scales measuring such items as dominance, so-

ciability, social participation and self-acceptance. The scores for Group I are lower than the scores for the other groups on the traits just mentioned. Similarly for Group II, in view of the positive traits attributed to them, one may anticipate that they will score very high on such traits as sense of well-being, socialization, self-control, and tolerance. Again, this is what happens for Group II. Group III was described as being power-oriented and forceful, the emphasis being on crude forcefulness rather than subtlety. This group receives the highest scores on a measure of striving for status and the lowest scores on two measures of intellectual efficiency and a measure of flexibility. Group IV was described as shrewd and manipulative, skilled at getting their wishes carried out by others, and as people with little guilt over any breach of ethics which they might commit. The subjects in this group all have extremely high scores on dominance and self-acceptance and the lowest scores on measures of responsibility, socialization, and self-control. For Group V, it was not possible to make predictions because of the lack of definition of the group. The scores for Group V never occupy an extreme position, tending to be midway between the values for the other groups.

DISCUSSION

The largest single group found in the study consisted of the stable, happy, well-functioning individuals. No doubt this represents the majority of dentists practicing today. Also note that within this group of stable, productive individuals, not one ardent advocate of hypnosis is to be found. It is important to re-emphasize that this study has been designed to minimize the effect of personal bias entering into the results. The psychologists who rated the individuals in the study had no knowledge of whether or not the person they were describing used hypnosis. They were simply asked to listen to a recorded interview and then furnish a description of the person who was interviewed. Their impressions are substantiated by the personality test data. Apart from this one relatively clear-cut distinction, the results are far from unambiguous. This is as it should be. It would have been very revealing if the subjects had been divided unambiguously into "good guys" and "bad guys" as in a TV Western and, frankly, we would have been somewhat suspicious of the data if this had happened.

One conclusion that immediately leaps to mind is that, obviously, hypnosis is an unsatisfactory and, perhaps, unsavory technic, judging from how its advocates are seen. This would be a most mistaken and unfortunate conclusion. One must be aware that within the groups of people described are many individuals who use hypnosis and who are seen as having many productive, useful traits. It would be a mistake to say that hypnosis, per se, is at fault. This would be analogous to blaming the pillow one rests one's head on for a bad dream one has had.

Perhaps, it would be more useful to look at the ways hypnosis was learned by the people who use it. The hypnosis users, in general, learned hypnosis in a commercial one to three day seminar which had no university sanction. In general, these courses were given in some geographical area which, coincidentally, is an attractive surrounding for a vacation. They have been held in such diverse places as Hawaii, Sun Valley, Churchill Downs during the racing season or on Carribbean cruises. Often the tax-write-off is emphasized in the descriptive brochures.

Hypnosis, in general, is not yet held in high esteem by the dental profession. If some new treatment technic was developed which met with opposition from dentists at large, one wonders if we would not find the same group of people advocating its use as now advocate hypnosis, perhaps even offering seminars in this new method of treatment. The point is

that hypnosis may be a useful tool for the dentist if he is properly trained in its use. However, if hypnosis is considered as a form of anesthesia, a one to three day course is not sufficient training for any form of anesthetic technic. The dentist who is interested in hypnosis must realize that he is, in essence, using a psychological and psychiatric technic. In order for him to be trained adequately in its use, he should realize that it is necessary for him to become sufficiently well-versed in psychology and psychodynamics to recognize the complications that can ensue from the use of such a technic, just as he must become familiar with the complications that can arise from the use of a given pharmaceutical agent. The authors believe that if it were possible to repeat the study described here on a group of dentists who had been willing to spend sufficient time to meet the criteria which psychologists and psychiatrists would demand of someone in their professions who used hypnosis, the results would be quite different from those presented here.

The second phase of our study interest was to determine how effective and efficient hypnosis or relaxation technics were when used in connection with dental procedures. This is a most important practical aspect for the dentist since it is closely related to the economic consideration of practice.

The patient who seeks a dentist who acknowledges his use of hypnosis may be attempting to place himself in an environment in which he can escape from the realities of an unpleasant or threatening life situation. He is willing to give up some measure of self-control and to sublimate his own ego to overcome his unconscious fears.

In our observations of the types of patients we saw receiving treatment, they all appeared to be passive, placid, and submissive in their attitude toward the dentists. They were eager to cooperate.

The method of study was as follows: the dentist who, we had been informed used hypnosis, was contacted either by letter or telephone. He was asked if he would permit observations of routine treatments in his office. The observer was provided with a checklist by the consulting psychologist of specific factors to look for as well as questions to ask. The observer kept an open notebook which could be seen by both patient and dentist when he made entries. The patient was introduced to the observer with the explanation that the observer was interested in studying how efficiently dentistry could be performed as well as in observing the patient's feelings about the method used.

This straightforward approach in no instance brought forth any hesitation or refusal to give complete cooperation. However, it must be pointed out that in no instance was there the opportunity to be present at the patient's first appointment with the dentist. Therefore, we must presume that all patients were selected because they were good subjects. This is not meant as criticism of the men who were generous in giving of their time cooperating in the study, because more valid data would be gained when the patient was one with whom the dentist felt more secure. Everyone is entitled to demonstrate his skills under most favorable circumstances.

Our first problem was to get interviews. If we initially asked if the dentist used hypnosis there was a categorical denial. When the question was modified and he was asked if he ever used any kind of relaxation procedures or suggestion technics, this received an affirmative answer. This was most interesting, because even men who were known to be using hypnosis and were active in study groups would not admit using it. They would be most evasive in their reasons why it would not be convenient to be visited by an observer. In one instance, the individual being queried by telephone pointed out that chemotherapeutics were more effective and satisfactory than hypnosis or any

of its related technics. He stated that it never worked for those who really needed it. Yet this individual has long been a student of the subject and has demonstrated his abilities before groups.

Others, who would lead us to believe the majority of their patients receive treatment under some form of suggestive therapy, confessed that they would find it difficult to arrange an appointment for a suitable patient on whom they could demonstrate treatment. This action is reminiscent of the demonstrations of some of the early exponents like Charcot who used paid, selected subjects for their teaching. In several instances after interviews were arranged, they were canceled or an indefinite future appointment was indicated.

By contrast, other dentists were most eager to embrace hypnosis. Their presentations for the observer were almost theatrical in exposition. They enjoyed playing their role and appeared to experience great satisfaction from their relationship with the patient—the measure of "control" they exhibited, as well as their skill and proficiency. These men usually indicated they often had helped patients by means of posthypnotic suggestion to lose weight, stop smoking or other undesirable habits.

All the men observed were highly competent dentists. They evidenced the best of clinical judgment in treatment as well as an unusually high degree of technical knowledge and dexterity. Their offices were thoughtfully designed, efficiently organized and staffed with well-trained personnel. As a result, treatment was carried out most expeditiously. One could not fail to have the impression that the same individual would have been equally proficient with the patient in the usual treatment situation, employing indicated sedation and local anesthetics. In some instances, the dentist did augment the hypnosuggestion with chemotherapeutics.

One got the impression that men treating the hypnotized patient enjoy the same detached satisfaction as though they were performing a similar task on a laboratory model or mannequin. No attempt at conversation or communication was necessary. Their own rather constant speaking is related to reinforcing the initial suggestions and often they apparently enjoy the sound of their own voice and the freedom to exercise their cleverness and imagination to create an illusion on which the patient was encouraged or directed to concentrate and relax.

The exaggerated measure of success that some men believe they enjoy with hypnosis is not necessarily related to their skill as hypnotists. It is rather that frequently they are sought out by suggestible patients of a psychic state that, in a sense, preconditions them to the type or character of therapeutic treatment they hope they will receive. The autosuggestibility of the patient is undoubtedly the primary factor that contributes to initial success. It is the same phenomenon that is often observed in the patient who refuses to have a local anesthetic administered because "I don't need it, and it (the procedure) doesn't bother me." Then this patient goes on to control himself and exhibit his capacity to receive extensive operative procedures that would be painful to others, in a completely detached, stoical and passive manner.

If the dentist enjoys community and professional reputation for his knowledge and for his ability to use hypnosis, then it may have some measure of practicability. However, the best figures that one finds reported indicate only a small percentage of the population—about 25 per cent—are suitable subjects and on only a percentage of this number could effective treatment be performed. Some men have found it desirable to set up special office environment; for example, rooms that are isolated and quiet to promote sleep and relaxation. Others use music or special tape recordings to promote relaxation.

The patient who can begin treatment without some initial time in preparation or training is rare. Therefore, the dentist must give some consideration to receiving a commensurate fee for the time necessary to teach a patient the method that will be employed for induction. The dentists observed remained with their patient the entire treatment time. They did not attempt treatment of more than one patient during the same scheduled period.

However, they were able to operate efficiently and effectively on the one patient. The subject remained completely quiet. Salivary flow did not show any notable increase so the ordinary saliva aspirator seemed to be adequate. When the mouth was flushed with water, patients quickly obeyed the command to expectorate. Gagging reflexes were not observed during the taking of impressions.

The observer was not convinced that either the rate of salivary flow or hemorrhage could be limited or controlled by suggestion. Some dentists stated that they possesssed ability to produce these effects. Others said they had only heard that someone else could do it.

It is our feeling that the emotionally disturbed patient requires the same investment of time and energy to achieve a comparable measure of treatment. Given similar circumstances of efficient, intelligent, auxiliary help and facilities, the dentist gains little. What the patient gains is dependent on the nature of his emotional problem.

There can be no question but that dentistry can be performed on the hypnotized patient. The question is how does one select the patient for hypnosis? Does the patient make the choice? Does one use it routinely? If not, how does one make the decision? The users of hypnosis state that they can readily determine if the patient is a suitable subject by subtly testing the subject's ability to follow instructions and to concentrate.

The men observed were not able to give any accurate information concerning how many patients can be deeply hypnotized or how deeply all patients can be hypnotized. From observation, all patients, since they were previously trained, were rapidly inducted on signal. However, it was difficult to determine the depth of hypnosis.

In many instances the subjects were comfortable, relaxed and did not appear to be asleep. They lay in the chair in a passive and submissive position. In some instances, the patient readily went into a hypnotic trance. It was possible then to transfer suggested anesthesia from the hand to the desired anatomic area of the mandible or maxilla. In no instances did the anesthesia follow anatomic or neurologic pathways. The amount of time required from the initiating signal until the dental procedure began was relatively short. Of course, this gave no indication of the amount of time that had been previously expended in training the patient to participate readily and willingly. In one instance the patient who apparently was not told that he was to be hypnotized showed definite hostility when he realized what was being done.

Much has been said about the dangers of employing hypnosis with patients possessing certain personality problems. Most dentists who use hypnosis agree that it can be dangerous if applied to certain patients. The observer was told that hypnosis never should be used on a disturbed patient, although no one explained how the dentist expected to reach in a few minutes a psychiatric diagnosis which might consume many hours of a psychiatrist's time.

It may be concluded on the basis of this study that dentists who are well-adjusted, who are relatively satisfied with themselves, and who obtain satisfaction from the conventional practice of their profession do not tend to use hypnosis or to become interested in its use. It is as if they do not need such an additional and unusual source of gratification.

Conversely, dentists who are not well-

adjusted and self-accepting seem to require some extraordinary activity or interest to satisfy their own personal needs. Approximately half of such dentists in our study seem to have settled on hypnosis as an answer to such needs. We would predict that the other half of these dentists would be found to be ardent advocates of some other new, unconventional, sensational technics or activities which result in personal prestige for the men who employ or advocate them.

There is a place for hypnosis in dentistry in carefully selected instances. Our concern, like that of medicine, is for well-trained, qualified dentists who have a knowledge of psychodynamics to use hypnosis only in performance of dental treatment, and who are qualified to recognize patients whose personality is such as to make them unsafe subjects for hypnosis.

Presented before the University of California School of Dentistry annual Alumni Meeting, January 1960.

*Chairman, section of psychology, School of Dentistry, University of California.

†Lecturer, section of psychology, School of Dentistry, University of California.

Financing and expanding dental education

William R. Mann, D.D.S., M.S., Ann Arbor;*
Shailer A. Peterson,† Ph.D., and Ben F. Miller III,‡
M.A., Chicago

The quality of dental service that the people of the United States should receive can be provided only if the financial support for dental education is increased substantially in the years immediately ahead. The lack of proper financing is the most serious problem of dental schools today. In 1958-59, the mean salary of all full-time dental teachers was $8,568,[1] compared to the mean net income of $14,311 for all nonsalaried, practicing dentists in 1958.[2] Many dental teachers are required to spend too great a percentage of their time in actual contact with students and have too little time for research or other scholarly activities; consequently, the number of teachers should be increased.

Also, there is some dissatisfaction with the quality of dental teaching, and better teachers can be attracted only if salaries are improved. Further, dental schools depend too much on part-time teachers. Finally, many dental schools rely upon tuition fees and income from their clinics to a greater degree than is desirable in an educational institution; indeed, several are much too dependent on such revenues. All these factors indicate the need for additional financial support to the

nation's dental schools if they are to graduate enough dentists to render proper dental treatment to the people.

If the problem of financing dental education could be kept within the boundaries of the present enrollment, it would be relatively easy to solve even though it would cost more money. However, the population of the United States is exploding, and the demand for dental services grows constantly. Existing dental schools will have to be expanded and new schools must be constructed if there are to be sufficient dentists. The costs of remodeling and constructing buildings must be considered as well as the funds that will be needed to operate new and expanded schools.

Furthermore, dental education is not alone in its financial plight. Estimates indicate that the number of young people attending the colleges and universities of this country will almost double by 1970, making necessary a vast building program and a great increase in the number of college teachers. The problems of financing higher education on a sufficient scale to meet the needs of the nation will be tremendous, and both private and public sources will be hard pressed. Within the complex framework of higher education, dental schools must obtain relatively greater financial support than they are now receiving, but the competition that dental education will encounter in seeking increased support will be more severe during the next decade than it has ever been before. However, the dental educators and other dental leaders responsible for presenting dentistry's needs have a very forceful argument: there must be an adequate supply of properly educated dentists if the health needs of the population are to be met.

FINANCIAL NEEDS FOR PRESENT ENROLLMENT

It is difficult to estimate accurately the amount of additional financial support the existing 47 dental schools should receive during the decade of 1960-70 in order to maintain their enrollments at present levels. In many educational circles it is commonly accepted that the salary budgets of colleges and universities should be increased 100 per cent by 1970,[3] but even this would not restore faculty salaries to the same relative position that they held in the national pay scale before World War II.

Certainly, the dental schools will need more than a 100 per cent increase in their salary budgets if they are to improve the quality of dental education. The average salaries of dental teachers are well below the average income of all dentists. The schools will find it increasingly difficult to retain their teachers, particularly if new schools are started and teachers find themselves in even greater demand than they are now. Also, the great reliance of dental schools on part-time teachers should be reduced; more teachers should be placed on a full-time basis, and more part-time teachers should be employed for half time or more; volunteer teachers should be replaced by half-time or full-time teachers. These needed changes in the composition of the dental faculties would require sizable increases in the salary budgets of the schools.

Since the value of the services of volunteer teachers is not known, an estimate of the cost can be only a guess. In 46 schools in the school year 1958-59 the deans indicated that there were 3,163 part-time teachers who were performing services equivalent to those that could be performed by 709 full-time teachers. If full-time and half-time teachers were secured to replace those serving less than half time, the added cost would be 4 to 5 million dollars if they were employed at salaries equivalent to the $14,311 mean income of dentists in practice in 1958.

In addition to the needed increase in salaries for teachers, dental schools will

also be faced with increasing other items in their operating budget. An estimated 50 per cent increase of these items by 1970 appears to be minimal. This increase is based on an estimated inflation of 20 per cent in the next ten years and a modest annual increase in the funds available for supplies, equipment, and other operating items.

In the 1958-59 school year the dental schools had a total income of 43.3 million dollars (Table 1). Of this amount approximately 15.6 million dollars was spent for salaries and 22.5 million dollars for additional operating expenses other than sponsored research (Table 2). If the salary budget were doubled and the additional operating expenses increased by 50 per cent, the schools would need about 26.8 million dollars more for operations in the next decade. This increase would mean that an annual expenditure of approximately 70 million dollars would be required for dental education by 1970 instead of the present 43.3 million dollars. The amount of 70 million dollars would be further increased to the extent that sponsored research and training programs are increased in the existing schools.

If those of today's part-time teachers who serve less than half time were largely

Table 1 • Income of dental schools for total basic operating expense by source of income and form of school control based on 47 dental schools, 1959

Source of income	Form of school control		
	All schools	State	Nonstate
	Amount		
All sources	$43,300,000	$20,488,000	$22,812,000
State general appropriations	12,000,000	11,335,000	665,000
Tuition and fees	11,484,000	3,443,000	8,041,000
Clinic income	6,994,000	2,349,000	4,645,000
University transfer (private funds)	5,317,000	—	5,317,000
Research grants	5,062,000	2,236,000	2,826,000
Private gifts	1,353,000	852,000	501,000
Endowment income	716,000	213,000	503,000
Donated teaching services	374,000	60,000	314,000
	Percentage distribution		
All sources	100%	100%	100%
State general appropriations	27.7%	55.3%	2.9%
Tuition and fees	26.5	16.8	35.2
Clinic income	16.1	11.5	20.4
University transfer (private income)	12.3	—	23.3
Research grants	11.7	10.9	12.4
Private gifts	3.1	4.2	2.2
Endowment income	1.7	1.0	2.2
Donated teaching services	.9	.3	1.4

Source: "Survey of Dental School Finances," Council on Dental Education, March 1959.

Table 2 • Expenditures of dental schools for total basic operating expense by form of school control based on 47 dental schools, 1959

Expenditure	Form of school control		
	All schools	State	Nonstate
	Amount		
All expenditures	$43,300,000	$19,030,000	$24,270,000
Research	5,200,000	2,150,000	3,050,000
Faculty salaries	15,600,000	7,380,000	8,220,000
Other operations	22,500,000	9,500,000	13,000,000
	Percentage distribution		
All expenditures	100%	100%	100%
Research	12.0%	11.3%	12.6%
Faculty salaries	36.0	38.8	33.9
Other operations	52.0	49.9	53.5

Source: "Survey of Dental School Finances," Council on Dental Education, March 1959.

replaced by teachers serving at least half time, the total annual 1970 expenditure of 70 million dollars for dental education would be increased by perhaps 3 to 4 million dollars. Additional teachers to reduce the present heavy teaching loads would increase the total still further to approximately 75 million dollars or more (Table 3). This amount would care for the 1970 needs of the present schools, but there would be only small increases of enrollment because the schools are now operating virtually at capacity.

When projecting estimates of future costs for higher education, one must determine whether any economies might be made to lessen estimated additional costs. Because of inadequate support in the past, dental education has already been forced to make every possible economy. In the decade following World War II, the dental schools in the United States increased their combined enrollments sharply, and they did so with as little added expense as they could. The schools now find themselves in an inflationary economy. Endowment income is much depressed in its purchasing power and many states are experiencing difficulty in supporting higher education. The dental schools can make no significant savings without decreasing the quality of their teaching or reducing their enrollments, and neither action would serve the best interests of the nation and its people.

The quality of a dentist's education is difficult to measure and the quality of dental education in the United States is extremely difficult to assess to everyone's satisfaction. The following statement illustrates the dilemma:

Table 3 • Estimated financial support needed for dental education by 1970

Item	Amount
Research (at 1958–59 level)	$ 5,200,000
Faculty salaries (double 1958–59 level)	31,200,000
Other operations (increased 50 per cent over 1958–59 level)	33,750,000
Amount required to increase number of teachers and to increase number serving half time or more	4,850,000
Total financial support needed for dental education by 1970	$75,000,000

Quality is a difficult dimension for both economist and educator to deal with, especially in the absence of objective means for measuring and comparing it. Educators are often tempted to judge it by such measures as expenditures per student, the student-teacher ratio, and the number of books in the library. But that is like judging an automobile or a suit of clothes not by performance, but by the factory conditions under which it was produced. Education, like any other productive process, must ultimately be judged by the performance of its end products, the students.

Despite certain charges to the contrary, most informed observers would probably agree that, by and large, the quality of American education today—school for school and college for college—is better than it has ever been. That, if true, is encouraging. But it is not good enough; for it seems equally clear that in the last twenty-five years or more the quality of education in the United States and the magnitude of our educational effort have not kept pace with the expanding educational demands which the changing world has imposed.[4]

Yet no single subject are dental educators more agreed upon than that dental education can and should be improved in the years ahead. The corollary is that additional funds for dental schools must be found. Not all the problems of dental education can be solved by additional support, but there are many that cannot be solved without it.

If dental education is to improve in the many ways that have been suggested, it must receive an annual income of approximately 75 million dollars by 1970, excluding any additional research funds that may be forthcoming from outside agencies by that time. Since income is now 43.3 million dollars, 31.7 million dollars must be obtained during the coming decade. Undoubtedly, inflation will permit an increase of about 1.5 million in clinic income, and tuition increases may account for approximately another 7 million dollars (by increasing the average tuition to $1,300 per year). The difference, about 24 million dollars, must be obtained from other sources to permit dental education to progress as an integral part of higher education.

Based on projected annual expenditures of approximately 75 million dollars, the average total cost per student per year would increase from approximately $3,000 in 1958-59 to approximately $5,000 in 1970. This average annual cost to the universities of $5,000 per dental student appears to be a realistic estimate for the coming decade when it is pointed out that the average cost per student in 1958-59 in the ten best-supported dental schools was approximately $6,400.[5] The ten schools with the lowest cost per student averaged approximately $1,860 in 1958-59 and, obviously, these schools are in serious need of financial help.

Actually, a projected basic annual operating expense of $5,000 per dental student by 1970 may be a rather conservative estimate. In the academic year of 1949-50, the median basic operating expense per student for all 40 schools then in existence was $1,316.[6] In 1958-59 the average was $2,967, or an increase of 125 per cent in nine years.[5] If a comparable increase were to take place between 1959 and 1970, the average annual total cost per student would be over $6,000.

MEETING FINANCIAL NEEDS OF TODAY'S SCHOOLS

Solving dental education's financial problems will be difficult, and its spokesmen must act with vigor, determination, and belief in their cause. Every branch of higher education will be able to argue convincingly for increased funds, and this may prove to be so frustrating and chaotic that no group will be able to establish clearly that its needs are greater than those of others. However, because of the importance of dental education and research to the welfare of the nation and because evidence shows that most dental schools presently face difficult financial problems, greater financial support must be forthcoming from (1) alumni, (2) students, (3) foundations, (4) benefac-

Table 4 • Approximate four-year cost of dental education to the student as of 1959–60 academic year

	Range of total tuition costs		Average total tuition costs	Range of total expenses (exclusive of living costs)		Average total expenses (exclusive of living costs)	Estimated average living cost*	Estimated average total cost
	Low	High		Low	High			
State-supported schools—18								
A. Residents	$ 800	$3,400	$1,905	$3,276	$4,811	$3,918	$8,205	$12,123
B. Nonresidents	1,200	4,800	3,171	3,658	7,211	5,213	8,205	13,418
Nonstate-supported schools—29								
C. All students	1,400	5,000	3,518	3,701	7,247	5,664	8,205	13,869
All schools	800	5,000	2,975	3,276	7,247	5,055	8,205	13,260

*Estimated average living cost is derived by adjusting the average living cost given in How Students Finance Their Dental Education by the 10.6 per cent increase in the consumer price index from June 1954, (115.1 per cent, Survey of Current Business, Vol. 34, p. S-5, August 1954) to March 1960 (125.7 per cent. The Wall Street Journal, April 26, 1960).

Sources: How Students Finance Their Dental Education, Council on Dental Education, American Dental Association and the U.S.P.H.S. Division of Dental Resources, 1956, p. 27.

"A Survey of the Cost of Dental Education to the Student for the Four Year Program, Exclusive of Living Costs," Council on Dental Education, American Dental Association, October 1959.

tors, (5) business corporations, (6) university funds, and (7) public funds.

Dental alumni have a definite obligation to contribute to the support of dental education to a greater degree than they do now. Dental students, along with graduate students, medical students, and others, have not been required to pay the full cost of their education, yet as alumni they often have failed to contribute to their dental school to the degree that they should. In addition to gifts to their own school, dentists should contribute to the Fund for Dental Education, Incorporated, an organization prepared to accept funds for the purpose of improving dental education on a national basis. Since there are only about 100,000 dentists in the United States, they cannot, of course, be expected to carry a major portion of the increasing financial burden of the dental schools; however, they should increase their support significantly.

Since the average tuition cost per student is now almost $750 per year, dental students should not be asked immediately to assume tuition payments much larger than at present. The high cost of dental education to students and the lack of adequate scholarship programs appear to be keeping many potential applicants from considering dentistry as a career. Table 4 shows that the average four-year cost of a dental education is $13,260. The present problem of obtaining a sufficient number of well-qualified applicants yearly would be aggravated further by increases in tuitions. During the decade ahead, however, tuitions may be expected to increase gradually, and it does not appear unreasonable to believe that dental students should continue their present proportion (26.5 per cent) of the cost of dental education. If this premise is accepted, the average annual tuition for a dental student in 1970 would be approximately $1,300.

With a few important exceptions, foundations have not contributed significantly to dental education, and few of the grants that have been obtained have been intended for the support of undergraduate dental education. In general, it is evident that the problems of

dentistry have not been well known or well understood by the foundations, and many of the proposals that have been submitted in the name of dentistry have not been well designed or presented. Every possible effort must be made to overcome obstacles such as these because the foundations of this country should contribute more generously to dental education during the next decade. The search for added financial support for the dental schools cannot end with the foundations, however; they do not have enough funds at their disposal to meet the pressing needs of dental education.

Benefactors other than alumni form a rather unknown and relatively unexplored source of support for dental education. Gifts and bequests from such individuals should be sought by each dental school and by the members of local dental societies. Efforts must be made to bring the story of dental education and its needs to the attention of potential donors, and it is hoped that this type of support will become important in future years. The business corporations of the nation form another source of potential financial support for dental education. Although they have been the most generous new source of funds for higher education, they have tended to aid those branches of education that are rather obviously related to their own manpower needs, such as engineering, chemistry, and physics. Any assistance received from this source will be largely from the dental industry, which unquestionably will support dental education to the maximum of its ability. However, it is not a large industry and its contributions cannot be as large in dollars as those of some other types of business even though they may be as high or higher in terms of percentages.

University funds already form a large portion of the support of dental education and, of course, the appropriated funds of publicly-supported universities should be so classified. However, dental schools in 1958-59 received only 27.7 per cent of their income from state general appropriations and 12.3 per cent from university transfers of private funds (See Table 1). In 1957-58 institutions of higher education in general received 48 per cent of their income from government and 16 per cent from endowment income and gifts.[7] Thus most dental schools do not now receive a proportionate share of the funds available to their parent universities. If dental schools in private universities received a proportionate share of endowment income and those in public institutions received a proportionate share of university funds, dental schools would be relieved from depending so greatly on clinic income and tuition fees for their operational expenses.

Even so, all the suggested potential sources and methods for obtaining greater financial support for dental education fall short of meeting the recognized needs of the next decade and beyond. It has become obvious to dental leaders, both in education and practice, that public funds are the only solution to the financial problems of the dental schools and that such funds must make up the difference between the total needs and the support that is obtained from all other sources. When public funds are considered, a differentiation must be made between state and federal monies. The additional support that is obtained from state governments will be almost entirely for the dental schools in state-supported universities, and these schools probably will be in a relatively better financial position than the schools in private universities. Unfortunately, many state governments are finding it increasingly difficult to obtain the funds needed for the support of their many agencies and programs. Therefore, even state-supported universities will find it more and more difficult to obtain increased appropriations.

The federal government is another

source of potential public support for the dental schools. The pros and cons of federal aid to education have been argued in the public press and elsewhere for the past several years, and many problems of philosophy, tradition, law, and administration attend direct appropriations for buildings, salaries and other operations.[8] Arguments related to federal aid will not be repeated, but it is important that the official position of the American Dental Association on this issue be recognized. For several years the Association has been in favor of federal aid for dental education, provided such aid does not affect admissions policies of the schools or the content of the curriculum. These are broad generalizations and they would not offer any apparent obstacle to federal aid. To date, however, a federal grants program to contribute to the operating expenses of dental schools has not been enacted.

Information collected by the Survey of Dentistry shows that the majority of presidents of the universities having dental schools favor federal aid to dental education. Similarly, the deans of dental schools favor such support. It can be concluded, therefore, that there would be little resistance by the schools to acceptance of federal funds to augment their operating budgets. These funds might be granted directly to the schools on some matching basis or by a formula related to the number of students. Alternatively, to provide operational support in an indirect manner, such funds might be granted to dental students as scholarships or fellowships that would permit them to pay significantly higher tuition fees.

It is difficult to establish whether or not dentistry should have priority over other types of higher education in receiving federal funds. Since dental health is closely related to the national welfare, in company with the other healing arts, it deserves federal support. Certainly, to the extent that federal funds become available for higher education, dentistry should receive its proper share as determined by whatever means are judged to be appropriate.

It is recommended that the federal government assist dental education by providing funds for operational expenses, as well as for new construction and remodeling, and for scholarship and loan funds for dental schools. This assistance should be in accordance with the safeguards approved by the American Dental Association and the American Association of Dental Schools.

EXPANDING DENTAL EDUCATION

The expected rapid growth in the population of the United States, together with the increasing demand for dental services, clearly indicates the need for an immediate expansion of dental manpower. Because the factors affecting and perhaps modifying the need are extremely complex, it is difficult to determine exactly how much expansion is needed. Improvements in the education of the people and in their standards of living, group purchases of dental care, fluoridation of public water supplies, more efficient office management and organization, greater use of auxiliary personnel, the increased use of high-speed dental equipment, and other factors will all influence the nation's dental manpower requirements. However, in order to maintain the present dentist-population ratio during the next 15 years, it will be necessary to increase the capacity of the dental schools of this country by 1975 to enable them to graduate about 6,180 dentists annually. This projection of the dental manpower needs is based on the conclusions presented recently in the report, *Physicians for a Growing America*.[9]

The significance of recommending that approximately 6,180 dentists be graduated each year by 1975 begins to come into perspective when it is realized

that 3,156 were graduated in 1959. Four recently established schools had not yet graduated their first class at that time, but by 1961 they will increase the annual number of dental graduates to about 3,300. In addition, one new dental school will be started soon in California and it will add about 75 graduates per year, making the total 3,375. By 1975, about 2,805 additional graduates per year will be needed to make up the difference between the estimated needs and the number of foreseeable graduates. In order to meet this difference it is necessary that, consistent with high standards, present schools be expanded and new schools constructed to permit the graduation of at least 6,000 dentists annually by 1975. Also, additional facilities should be provided for the training of auxiliary personnel.

Part of the difference can be closed by continuing the expansion of existing schools which began at the end of World War II and which has provided 750 of the 1,100 new freshmen places that have been added to the capacity of the schools since then.[10] Table 5 shows that this expansion has been able to keep the dentist to population ratio constant since 1950. At present, according to a survey conducted by the Council on Dental Education of the American Dental Association, the schools have plans for expansion and remodeling that would add 287 freshman places by 1963 if the needed funds can be obtained. If matching grant funds were available, the schools indicate that they could raise this to 485 new freshman places by 1963. The total cost of the construction needed for an increase of 485 places is estimated at about 104 million dollars.[5] When completed, the additional number of yearly dental graduates needed would be 2,320.

If the increase of 2,320 graduates were to be reached solely by establishing new schools, it would be necessary to establish more than two new schools each year beginning in 1961 and extending to 1971.

Table 5 • Total number of dentists and number of dentists per 100,000 population, 1810–1958

Year	Number	Rate
1810	50	1
1820	100	1
1830	300	2
1840	1,000	6
1850	2,923	13
1860	5,606	18
1870	7,988	20
1880	12,314	25
1890	17,498	28
1900	29,665	39
1910	39,997	43
1920	56,152	46
1930	73,108	59
1940	81,686	62
1950	86,876	57
1951	—	—
1952	88,920	57
1953	90,815	57
1954	92,851	57
1955	94,510	57
1956	96,227	57
1957	97,610	57
1958	98,540	57

Source: Health Manpower Source Book, Section 9: Physicians, Dentists, Nurses, U.S.P.H.S. Publication No. 263 (Washington, U.S. Government Printing Office, 1959), p. 48.

A total of 23 new schools would be needed, and each would have to admit 100 freshmen per year. The cost of building these schools would be approximately 138 million dollars, based on the estimate of 6 million dollars per school in *Physicians for a Growing America*.[9] Thus, the costs of expanding and remodeling existing schools and of constructing new ones to provide the needed capacity for educating dentists will require approximately 242 million dollars.

An alternative would be to encourage still greater expansion of the existing schools that is now being planned. This method would have some advantages because experienced administrative officers would be available and faculties would need only to be enlarged. If additional expansion of the schools could provide more than 485 additional freshman places, the number of new schools could be reduced accordingly.

It is important to determine carefully

the locations of new schools. They should be established in areas where the population is increasing rapidly, where adequate financing is possible, and where they might best serve the dental profession by becoming centers for continuing education. By such criteria the following locations would seem appropriate for new schools: Washington or Oregon, California (3, including U.C.L.A.), Colorado, Arizona or Utah, Florida (2), South Carolina, Connecticut, Massachusetts, Kentucky, Oklahoma, Texas, New York, Illinois, Wisconsin, Ohio, Michigan and Pennsylvania.

It is unlikely that regional pacts will play an important role in establishing new dental schools to meet the increasing manpower needs. Such pacts may be helpful to certain states by providing places for their residents to obtain a dental education, but they do not add to the manpower pool because they do not create new training facilities. To help increase dental training capacity, the pacts would have to provide for the construction of new schools, but there is some question that one state can or will appropriate funds to erect a building in another state.

Some of the disadvantages of regional pacts also apply to the establishment of two-year dental schools. Such schools would offer instruction in the basic sciences and in preclinical technics, but they would depend on the four-year schools to accept their students for clinical instruction. Again, whether such a school were intended to serve a region or the entire country, it would make no contribution to the clinical training capacities of dental education. Actually, to develop such schools would mean that more freshmen would be accepted each year than could be trained with existing clinical facilities. In addition, such a development would make a vertical integration of the curriculum impossible. Therefore, such schools should not be established unless there is every intention of developing them quickly into four-year schools.

As new dental schools are established, every effort should be made to locate them on the campuses of their parent universities. The physical separation that exists for a number of today's schools makes it impossible for either teachers or students to participate in typical university life or to receive the intellectual stimulation usually obtained in an academic atmosphere. Of course, when decisions about locations are made, consideration must be given also to the relationship of the dental school to the medical school.

As the next decade unfolds, more information will become available about how improvements in dental practice, including better use of auxiliary personnel, will reduce the manpower needed. If any significant trend becomes apparent, the training capacity of the dental schools could be adjusted readily. At this moment it appears unwise to plan for dental manpower needs that are any less than those described.

Those planning new or expanded schools should contemplate operating expenses of about $5,000 per student per year by 1970. This figure represents the total cost per student and includes a share of general university administration, the cost of any teaching services that may be provided by medical schools or others, maintenance of buildings, retirement programs, cost of library, and so forth. This total amount would be reduced by tuition fees, clinical income, overhead payments on research projects, and any incidental income.

As previously outlined in this report, the annual total of the operational budgets of the dental schools now in existence should approximate 75 million dollars by 1970. This amount would accommodate their present enrollment of 13,700 undergraduate students and 1,300 full-time graduate and postgraduate students. Additional annual support of 65

Table 6 • Projected annual expenditures for dental education in 1971

Item	Amount
Operational budgets of 47 schools now in existence (See Table 3)	$ 75,000,000
Costs of additional students in new and expanded schools—13,000 students at an estimated $5,000 per student	65,000,000
Research grants to new schools	5,000,000
Total annual expenditures projected for dental education in 1971	$145,000,000

million dollars would be needed by 1970 to accommodate the additional enrollment of approximately 13,000 students in expanded schools and in new ones. Increased full-time graduate and postgraduate enrollment in new or expanded schools or improvement of existing programs will increase the operational budgets accordingly. Dental schools therefore will need a total annual income of 145 million dollars by 1971 if they are to provide the quality and quantity of dentists necessary for maintaining good dental health in this country (Table 6).

Table 7 summarizes the additional financial support that would be needed for the operations of the dental schools by 1971. The operational budgets of the schools should be receiving annual support of 73.7 million dollars more than their present and anticipated income from the various sources that have been discussed. In addition to this increased annual support, 242 million dollars should become available during the next ten years for the remodeling of old schools and the construction of new ones. A suggested schedule by which such funds should become available follows:

1. By 1971, additional annual support of 31.3 million dollars should become available to the present 47 dental schools for improving their operational budgets. This total might be attained through annual increments of 3.1 million dollars over the next ten years.

2. By 1971, a total of 242 million dollars should have been made available for remodeling old dental schools and constructing new ones. An amount of 24.2 million dollars should become available each year from 1961 to 1971. Preference

Table 7 • Summary of additional financial support needed for the operational budget of dental schools by 1971

Estimated total of expenditures for dental education by about 1971		$145,000,000
Less present and anticipated income:		
Present income of dental schools	$43,300,000	
Tuition from 13,000 additional students (at average of $1,300 each)	17,000,000	
Clinic income produced by new students	6,000,000	
Research grants to new schools	5,000,000	
Total present and anticipated income		$ 71,300,000
Net additional support required for operational expenditures of dental schools by about 1971		$ 73,700,000

should be given first to expansion of existing facilities.

3. By 1971, 42 million dollars should become available for the operational budgets of new or expanded dental schools. The need for these funds might lag slightly behind remodeling and construction, but it would be necessary in many instances to develop adequate faculties for new or expanded enrollments. For this reason, 4.2 million dollars should become available each year from 1962 through 1971.

*Professor of Dentistry, School of Dentistry, The University of Michigan, and Director, Section on Dental Education, Survey of Dentistry in the United States.

†Secretary, Council on Dental Education, American Dental Association.

‡Assistant secretary, Council on Dental Education, American Dental Association.

1. From data collected by the Section on Dental Education, Survey of Dentistry in the United States.

2. American Dental Association, Bureau of Economic Research and Statistics. The 1959 survey of dental practice: II. Income of dentists by location, age and other factors. J.A.D.A. 60:650 May 1960.

3. Keezer, D. M., ed. Financing higher education: 1960-70. New York, McGraw-Hill Book Company, 1959, p. 71.

4. Keezer, D. M., ed. Financing higher education: 1960-70. New York, McGraw-Hill Book Company, 1959, p. 16.

5. American Dental Association, Council on Dental Education. Survey of dental school finances, March 1959. Mimeographed.

6. Federal Security Agency, Public Health Service. Financial status and needs of dental schools. Washington, U. S. Government Printing Office, Public Health Service Publication No. 200, 1952, p. 50.

7. Keezer, D. M., ed. Financing higher education: 1960-70. New York, McGraw-Hill Book Company, 1959, p. 36.

8. Hatcher, Harlan. An address to the University of Michigan Club of Washington. Reported in The Ann Arbor News, Feb. 25, 1960, p. 19.

9. United States Department of Health, Education, and Welfare, Public Health Service. Physicians for a growing America, a report prepared by the Surgeon General's Consultant Group on Medical Education. Washington, U. S. Government Printing Office, Public Health Service Publication No. 709, 1959, p. 70.

10. United States Department of Health, Education, and Welfare, Public Health Service. Physicians for a growing America, a report prepared by the Surgeon General's Consultant Group on Medical Education. Washington, U. S. Government Printing Office, Public Health Service Publication No. 709, 1959, p. 69.

Art of Reading • The art of reading implies the art of non-reading, and more energy is sometimes needed in order to skip rather than continue useless drifting. Many would-be scholars never learn anything not only because they cannot read, but also because they cannot stop reading: they are like asses turning round and round in a mill with blinkers on their eyes.

Before attempting to read a learned book one should find out whether it is worth reading, and if so one should prepare oneself to give it the kind of reading which it demands. The table of contents will tell us what the book contains and how it is built. The preface and introduction explain the author's purpose and methods. The bibliography lists the sources. The index enables one to do a bit of sampling. After having used those preliminary means of investigation, any intelligent scholar should be able to decide whether he should read some parts of the book, or the whole of it, or leave it alone. When the reading is begun, he should be prepared to interrupt it and to regulate its speed and intensity. *Notes on the Reviewing of Learned Books, George Sarton. Science 131:1183 April 22, 1960.*

Income taxes—deduction of expenses for education

Hal M. Christensen, LLB., Chicago*

In a recent Internal Revenue Service ruling[1] relating to income tax treatment of expenses incurred by taxpayers for education, certain tests were laid down for determining whether such expenses are deductible as "ordinary and necessary business expenses."

Generally, such expenses are deductible if they are for education undertaken primarily for the purpose of "maintaining or improving skills required by the taxpayer in his employment or other trade or business."

Such expenses are considered "personal, living or family expenses" and not deductible if they are expended to enable taxpayer to meet the minimum requirements for establishment in his intended trade, business, profession or specialty therein.

Thus, expenses incurred for education to qualify a person for licensure as a dentist or to qualify a general practitioner as a specialist would not be deductible. On the other hand, expenditures for refresher courses or postgraduate studies taken by a practicing dentist to improve his operative technic or sharpen his understanding of new developments in dentistry would be deductible if the taxpayer-dentist could demonstrate that such educational programs were undertaken to "maintain or improve skills required in his . . . business."

"If it is customary for other established members of a taxpayer's trade, business (or profession) to undertake education of the type pursued by taxpayer, the taxpayer will be considered to have undertaken such education for the purpose of maintaining or improving skills."

According to the Internal Revenue Service ruling, the key question to be answered in determining deductibility of educational expenses is:

Has taxpayer met the minimum requirement for qualification in his established position?

If the answer is "no," no deductions are allowable. If the answer is "yes" and the person is engaged in a trade or business in which other established members customarily undertake education of the type pursued by taxpayer, the taxpayer is entitled to the deduction.

A recent report by the Association's Bureau of Economic Research and Statistics on advanced dental education[2] may be extremely helpful to dentists in making a showing in support of the proposition that established members of the profession "customarily undertake education of the type pursued by taxpayer." The report, which is part of the 1959 Survey of Dental Practice, contains the following findings which would appear to offer substantiation of the fact that dentists "customarily undertake edu-

cation" to "improve and maintain their skills":

"Nine types of courses and programs in advanced dental education were listed on the questionnaire, and respondents were asked to check the types they had taken since graduation from dental school. Eighty-one per cent of nonsalaried respondents indicated they had received some type of advanced dental education.

"Dentists were asked whether they had taken any of the nine listed types of courses during 1958, and, if so, the number of classroom hours (including laboratory hours). Nearly half (45.4 per cent) of all nonsalaried dentists reported taking some type of advanced dental education during the year."

*Secretary, Council on Legislation, American Dental Association.

1. Rev. Rul. 60-97, Int. Rev. Bul. No. 1960-11, March 14, 1960, 26 CFR 1.62-5.

2. American Dental Association, Bureau of Economic Research and Statistics. The 1959 survey of dental practice. V. Advanced dental education; hospital appointments. J.A.D.A. 61:373 Sept. 1960.

Fluoride Naturally Present • Fluoride occurs naturally in water used by communities in 43 states, according to a Public Health Service report entitled "Natural Fluoride Content of Communal Water Supplies." The water supplies of 1,903 cities and towns with a combined population of 7,000,000 contain enough fluoride naturally to prevent two out of three dental cavities. In Texas 2,700,000 persons in 356 towns use naturally fluoridated water; in New Mexico, 465,000 people, or 68 per cent of the total population, live in communities with such water supplies. More than 450,000 people in 136 Illinois towns, and 406,000 in 184 Iowa communities, drink water with fluoride present in nature. At least 100,000 people in each of ten states—California, Colorado, Florida, Idaho, Indiana, Kansas, Louisiana, Michigan, Ohio and Wisconsin—live in towns served by naturally fluoridated water supplies. The fluoride found naturally in water is identical in its effect to the fluoride used in controlled fluoridation. The 35,000,000 people living in the 1,800 cities which now use controlled fluoridation, plus the 7,000,000 using naturally fluoridated water, mean that one of every three people using central water supplies now drinks water that has been fluoridated by nature or by the community. *Pub. Health Rep. 74:884 Oct. 1959.*

editorials

First White House Conference on Aging

From the ninth to the twelfth of this month, a conference of major importance—the first White House Conference on Aging—will be held in Washington, D. C. Made possible by an act of Congress in 1958, the Conference will consider the full range of problems affecting America's 16 million senior citizens and take steps leading toward the orderly solution of those problems. The meeting will be attended by some 2,800 voting delegates, 1,747 of whom will be official representatives of their states appointed by their governors. Among the remaining delegates will be representatives of some 300 national volunteer organizations interested in various aspects of health and social welfare.

Because of its interest in specific aspects of the aging population problem—those aspects having to do with the biologic, social and economic effects resulting from dental disorders—the American Dental Association will be well represented. Spokesmen for the Association will be Charles H. Patton, president; John R. Abel, president-elect; Harold Hillenbrand, secretary, and Donald E. Flieder, who, like Dr. Hillenbrand, is a member of the National Advisory Committee of the Conference. Not until the complete roster is published will it be known how many members of the dental profession will be among the 2,800 state delegates. According to a survey conducted by the Council on Dental Health, 29 state dental associations were represented on their governor's commission on aging last summer which indicates that dentistry will have a respectably vocal delegation at the national meeting this month.

Although it has long been recognized by both the public and the profession that the dental health profile of the older segment of our population is far from satisfactory, not until recently has any epidemiological study been undertaken to determine the seriousness of the problem. Studies by the U. S. Department of Health, Education, and Welfare[1] now indicate that 22 million, or 13 per cent of our population, are edentulous—a figure which ranges from 4 per cent of persons between 25 and 34 years of age to 67 per cent of persons 75 and older. Tragically, two thirds of America's

population over 75 have lost all their teeth. "Surveys[2] have shown that about 90 per cent of the aged who have remaining natural teeth have periodontal disease, and more than one third of them need extractions because of diseased supporting tissues or dental caries. Of the edentulous patients, which make up 60 per cent of the total group, about one out of every three has no dentures for adequate mastication of food."

No one knows better than the dentist how a major loss of masticating efficiency adds to the physical discomfort and mental distress of patients who are already overburdened by infirmities and injuries which frequently come with accumulated years. And no one is better equipped than the dentist to do something about it. Means must be sought to relieve, in so far as possible, the unhealthy and, all too frequently, unnecessary dental disorders that distress a large proportion of our elderly population.

Although it is important that means be found to modify this distress, it is more important to find measures that will prevent it. Some of those measures have long been known but they have not been completely put into practice: effective preventive dental programs for children, effective dental education programs for the public and water fluoridation. These methods, augmented by an intensified program of research, form the logical basis for a long-range attack on dental disorders—an attack based on prevention rather than cure. In the meantime a growing number of today's senior citizens need dental care.

It may be that the final report of the Conference will contain some sound recommendations for the implementation of both a long-range and a short-range dental health program that will deal systematically with the complex dental problems of the aged. No matter how sound and substantial such high level recommendations may be, their ultimate effectiveness will depend on how quickly and how sanely they are put into action on the state and community level.

1. Health statistics. U. S. Department of Health, Education, and Welfare, Series B. No. 22, Sept. 1960, p. 11.
2. Dental health and the new social programs (Mimeographed), U. S. Public Health Service, Division of Dental Public Health and Resources, Fall 1960.

National Children's Dental Health Week: designed for youth; all ages benefit

By the time the last copy of this January issue of THE JOURNAL has reached the last member of the Association, the widely publicized White House Conference on Aging will have been adjourned and its hundreds of recommendations given to appropriate agencies for editing and printing.

In so far as recommendations concerning the dental problems of the aged are concerned, it is hoped that one will state forthrightly and emphatically that the most

effective and economical way to assure that the elderly will have a minimum of dental disorders is to prevent those disorders from occurring. Such a recommendation would be in accord with a long-held recognition by the American Dental Association of the soundness of preventive dentistry—a recognition which gave birth to the annual National Children's Dental Health Week, dedicated to the health and welfare of American children. This year this annual affair will be held from the fifth through the eleventh of next month.

Although National Children's Dental Health Week is directed primarily toward American youth, the program helps safeguard the dental health of all citizens of all ages. Each year since the movement was initiated by the Cleveland Dental Society in 1941 it has grown in magnitude and influence. Directed nationally by the Bureau of Dental Health Education and implemented locally by component dental societies, the program enables members of the dental profession to contribute more substantially to the health and well-being of their community. It does this by:

1. Stimulating public and private health agencies and boards of education to provide children with preventive dentistry.

2. Educating parents to instill in their children better dietary habits, better mouth hygiene habits and a better appreciation of professional dental service.

3. Motivating communities to fluoridate their public water supply.

There has been a gratifying increase in public understanding of good dental health since the inauguration of National Children's Dental Health Week. As this understanding grows, it is transformed into action with the result that not only children but people of all ages—including the aged—benefit. National Children's Dental Health Week is a made-to-order project, custom-built for dental organizations. It is hoped that each of the Association's 443 component societies is working with the Bureau of Dental Health Education by promoting the program in its area. Those societies that are not are missing a great opportunity.

Accepted Dental Remedies—Mark XXVI

With almost biological rhythmicity our dental family each year is blessed with a new version of *Accepted Dental Remedies,* the official publication of the Council on Dental Therapeutics of the American Dental Association. The twenty-sixth edition has just been released. Like previous editions it is aimed at the dental practitioner and it is expected to receive wide acceptance.

The 1961 edition of *Accepted Dental Remedies* represents the results of a careful and comprehensive revision of the 1960 edition. All in all, over 600 changes have been made to convert the 1960 edition into the 1961 edition. New findings have been included in old discussions. Certain portions of the book have been entirely rewritten. New sections have been added. Obsolete material has been deleted. The 1960 and 1961 editions most certainly are not the same; and the editions of five and ten years ago are today chiefly of historic interest.

Among the new sections of the book, the new chapter on fluorides is worthy of special mention. This chapter contains discussions on the physiology of fluorides, fluoridated water, dietary fluoride supplements, the topical application of solutions of sodium and stannous fluorides and dentifrices which contain stannous fluoride. Discussions on new analgesics, new local anesthetics and new antibiotics appear in their respective chapters. A new and interesting section on the use of enzymes in dentistry begins on page 150 of the book. This section includes concise, lively discussions on hyaluronidase, proteolytic enzymes and plasminogen activating enzymes.

The dental practitioner who wishes to remain a student of modern dentistry should include a copy of the latest edition of *Accepted Dental Remedies* in his library. Reading this book is a relatively painless way of keeping up to date in the field of dental therapeutics. Indeed, for some busy practitioners it may be about the only way. It can be a timesaver and, in many instances, eliminates the need to "take pen in hand" to write a letter of inquiry about certain products or therapeutic measures.

By ordering a copy of the 1961 (twenty-sixth) edition of *Accepted Dental Remedies* now, the dentist can have the advantage of the newest edition for an entire year. Copies can be obtained from the Order Department of the Association upon remittance of $3.00, slightly more than 1 cent a page.

international dentistry

News from Argentina

ARGENTINE SOCIETY OF ORAL SURGERY

The Argentine Dental Association has established a section on surgery. This is the fourth specialist group to be incorporated in the A.O.A. G. Ries Centeno, chairman of this section, explained the purpose of the new society at its inaugural session and read a letter of greeting from Fred Henny, president of the American Society of Oral Surgeons, a part of which follows:

"I am very proud of your decision to establish a Society of Oral Surgery and I believe that I have had a small part in its creation. Please accept my most sincere good wishes for every success in your enterprise. Your society is quite different from that which we have in the United States where only professional men who limit their practice exclusively to oral surgery are members. But as your problems are different from ours, I am convinced that your organization will make a great contribution to oral surgery not only in Argentina but in other South American countries. You are pioneers who I hope will be appreciated and imitated by other countries in the future."

INTERNATIONAL DENTAL CONGRESS OF URUGUAY-ARGENTINA

This congress is planned for November of 1961 and will be held in Montevideo, Uruguay. The A.O.U. and the A.O.A. have begun to plan for this event. The Argentine association has named the following delegates: R. Otaño Antier, J. M. Lueje and J. S. Quirch. The former congress (Buenos Aires 1959) was the most important dental meeting to date, with 2,400 in attendance. It is anticipated that the forthcoming meeting will have the same support from the profession of the two countries united by traditional friendship and from our dental colleagues in the rest of America.

SCHOOL DENTAL HEALTH CONTEST

The Division of Dentistry of the National School Health Department has organized a contest for composition and drawings on dental subjects for students at the various school levels. Some of the titles suggested for the compositions are "Sound Teeth, beautiful smile," "Sweets, enemy of your teeth," "Brush your teeth after every meal," and "Teeth, the sentinels of health and beauty." For art students the following subject was suggested: "The first permanent molars are yours for a lifetime." Head of the Division of Dentistry is A. Rapoport.

PRESENT AND FUTURE OF MEDICINE AND DENTISTRY

A two-day symposium was held recently in the postgraduate school of the University of Cordoba on the present and future of medicine as a profession, public service and social instrument. Only one subject pertaining solely to dentistry was dealt with—"Dentistry in a public health plan." The majority of the papers were related closely to the problems of our profession through the many points of contact which exist between medicine and dentistry. D. Sevlever and Ch. B. Di Pasquale were the dental representatives attending as guests of the School of Public Health of Buenos Aires.

At the recent meeting of the Argentine Association for Children's Dentistry there was a discussion of the preventive aspects of the profession in the future. This demonstrates that there is a deep interest in Argentina in

the problems concerning the profession not only from the point of view of social service but private practice as well, and an interest in all phases of public health which is growing continuously.

SPECIFICATIONS LABORATORY

Preliminary plans are under way for the creation of the office for standards of dental materials for Argentina.

Juan Chaneles, C.D.

Additional news from Argentina

The College of Dentistry of the University of Buenos Aires is still closed by law. Strenuous efforts are being made to reopen the doors and continue the activities of the University. Reorganization of Argentina universities, following the revolution of 1955, is a long and laborious procedure.

The Dental Association of Argentina is launching a program to encourage its members to greater scientific activity with a view toward advancing the profession as a branch of science.

Ricardo Crespi, C.D.

News from Chile

HONORED

Carlos Tapia, dean of the Faculty of Odontology of the University of Chile, has been honored by the government of France with a decoration for his services rendered the dental profession and his contribution to closer relations between the people of Chile and France.

NEW HEADQUARTERS

The Dental Society of Chile, presided over by Pablo Sainte-Marie, has moved to its new location where comfortable appointments for lecturers and demonstrators are provided for. With a membership of over 400 dentists and already past its fiftieth anniversary, it is the oldest dental organization in the country.

LATIN AMERICAN ODONTOLOGY DAY

October 3 was the date chosen to celebrate Dental Day at a meeting held in Montevideo, Uruguay in 1925, attended by delegates from Latin American countries. In 1960 it was celebrated successfully with educational programs presented in the schools and various other activities. The great figures in the history of the profession were remembered, and colleagues who had completed 40 years of active practice were presented gold pins and diplomas.

EARTHQUAKE DENTAL RELIEF

The Dental University Club, in the name of all Chilean dentists and particularly of its stricken colleagues, wishes to express its thanks for the donations received and the many notes of sympathy and encouragement sent to them. The club consists of dentists who are graduates of or have done postgraduate work at an American University. Stimulated by the spirit of solidarity shown by its colleagues in the United States, it is endeavoring to attain closer relations between the peoples of both continents, particularly on the professional and educational level. Suggestions toward this end are welcomed by the club. Communications can be sent to Manuel E. Moreno, M. Cousiño St., no. 86, suite L303, Santiago.

Raul Muñoz Inza, C.D.

News from Great Britain

BRITISH DENTAL JOURNAL

Memorandum on School Dental Services • A memorandum on the local authority dental services has been prepared by the British Dental Association for government bodies both central and local who have responsibility for the dental health of children

The memorandum is in four parts: the first is historical; the second establishes the need for that priority service which was promised in 1946 and which is as far off today as it was then; the third considers the present deficiencies; the fourth states the steps necessary to establish the service required which are as follows:

Causes of Breakdown • It is clear from the previous parts of this memorandum that the unenlightened and apathetic attitude of the local authorities, coupled with the complacency of the Ministry of Education, has resulted in a virtual breakdown of the school dental service.

After careful consideration, therefore, the Association is of the opinion that in the first

instance a very real effort must be made by the Ministries concerned to ensure that the school dental service, although remaining under the administrative direction of the local authorities, should be so organized as to be able to face up to the problems set out in this document in a way likely to produce satisfactory results.

The British Dental Association is firmly of the opinion that the whole outlook of local authorities toward dental disease needs to be changed completely.

Past history records the importance attached by local authorities to preventive medicine and the safeguarding of public health. Their attitude to dental health and preventive dentistry must be changed so that they recognize and seek a remedy for a situation which is a public scandal.

Under the Chief Dental Officers the chain of command should be direct and efficient and no longer subject to pointless medical control at area and divisional levels.

Teachers, nurses, health inspectors, health visitors, midwives and welfare workers must all be interested and therefore kept informed of measures necessary for promoting dental hygiene and the elimination of dental disease so that they can be part of the team which will tackle the problem of educating the public.

The fundamental fact that a dental service which gives inspection to a child only once every two or three years—if at all—is not only useless in the long run but a waste of money, must be fully understood by the local authorities.

More Senior Posts Required • The creation of a department of dental health and the expansion of the school dental services would automatically require the creation of more senior clinical and administrative posts with a consequent improvement in the career prospects.

Finally, the basic salaries paid must be adjusted at an early date so that no young dental surgeon need be discouraged from entering the local authority by purely financial consideration.

If local authorities do not offer realistic salaries the service is doomed to failure and will continue to deteriorate from its already unsatisfactory state.

Dental Auxiliaries • J. V. Bingay, director of the new Training School for Dental Auxiliaries, has written a most interesting article, excerpts of which follow:

"As many members of the profession know, the School for Dental Auxiliaries opened at New Cross, London, October 3, 1960. In view of the interest aroused by the experimental scheme for training and employing dental auxiliaries, the time may be opportune to give some account of the project and the curriculum to be followed during training.

"The building is situated in the grounds of New Cross General Hospital and is an adaption and extension of an unused and incompletely constructed isolation block, which was originally intended to provide sixty small single wards on two floors. It has been replanned to provide on the first floor a school for one hundred and twenty students with administrative offices, and on the ground floor a clinic with thirty-one individual surgeries.

"The course extends over two years and is devised to meet the requirements of the Act and the conditions imposed by the General Dental Council.

"During their first year students will spend some four hundred hours on lectures and demonstrations and about eight hundred hours in tooth carving, practical instructions on the phantom head, and so forth. If at the end of the first year the student has reached a satisfactory standard of skill she will then proceed to clinical work on patients, under the strict supervision of the dental surgeons on the staff, and always subject to the limitations imposed on the scope of her work.

"Patients will be drawn mainly from London County Council schools in the New Cross area and in addition mothers with children of preschool age will be encouraged to bring them to the clinic for treatment.

"During the first year the teaching staff will consist of the director and three other dental surgeons who will be assisted by three tutors trained in New Zealand under the school dental nurses scheme.

"As a result of notices sent to youth employment officers, advertisements in the national and local press, and publicity through the B.B.C., an overwhelming response was received to the invitation to apply for the sixty places available in the first year. Within a short period over three thousand inquiries were received with a final total of 1,100 firm applications. Sixty students were selected for the course, coming from all parts of the United Kingdom."

DENTAL HEALTH CAMPAIGN IN CINEMAS

The opportunity to place dental health education into the hands of certain sections of the public does not arise often. Recently a well known dental supply house promoted an exhibition of modern dental equipment in selected

areas in the United Kingdom in connection with the showing of a film "Dentist in the Chair." Supported by educational material addressed to both children and adults, this campaign proved a great success, with several interesting facets of the public attitude toward dentistry becoming apparent.

1. Parents accompanying children show acute interest in oral hygiene and are delighted to receive instructional literature, a fact which implies that many parents are not normally approached with this material.
2. The public is confused about the value of toothpaste, and has little appreciation of the cause or magnitude of tooth decay.
3. There are certain classes of the public who show deep resentment at the initial £1 treatment fee in the National Health Service, which seems to provide a genuine reason for nonattendance at the surgery.
4. The subject of the ultra-speed handpiece was uppermost in the minds of children and adults alike. Most repeated question was "Is it true it doesn't hurt?"

Ministry of Health authorities and others concerned with dental health are convinced that oral hygiene is primarily a matter for parental control. It is surprising, therefore, that a vast section of the adult public remains unapproached on the necessity of guiding their children along the right lines.

ITEMS OF INTEREST

British Dental Association • The next annual conference of the British Dental Association will be held in Harrogate, Yorkshire; Mr. Percy Cocker has been named president-elect.

Health Education • A memorandum on Dental Health Education from Mr. W. Stewart Ross was considered by the Council of the Association, and it was unanimously agreed that a body within the B.D.A., charged with the dissemination of dental health education material and facts, would enhance the status and prestige of the Association and the profession, and that if the necessary funds were available the Dental Health Committee should be authorized to proceed with the project as outlined in the memorandum.

Mr. Ross explained that the memorandum he had presented arose as a result of the meeting in Dublin between members of the association, their public relations adviser, and Harold Hillenbrand, secretary of the American Dental Association. They had discussed the work that the A.D.A. had carried out in the field of dental health education over the past 25 years and the difficulties they had encountered at the start.

A joint committee of the Central and Scottish Health Services Councils has been appointed under the chairmanship of Lord Cohen of Birkenhead with the following terms of reference:

"To consider whether, having regard to recent developments in medicine, there are any fresh fields where health education might be expected to be of benefit to the public; how far it is possible to assess the results of health education in the past, and in the light of these considerations what methods are likely to be most effective in future."

Teachers • It has been decided to form an Association of Teachers of Conservative Dentistry with the primary object of organizing meetings for teachers of conservative dentistry in the United Kingdom.

Commemoration Lecture • Lester R. Cahn of the University of Columbia, New York, gave a most interesting Wilkinson Commemoration Lecture at the Turner Dental School in Manchester in October. The title was "The Pathology and Treatment of Periapical Lesions."

Royal College of Surgeons • Congratulations to Sir Arthur Porritt who has been elected president of the college. Sir Arthur has shown great interest in the Faculty of Dental Surgery and his election is a very popular one.

G. H. Leatherman,
D.M.D., F.D.S., R.C.S., F.A.C.D.

News from Korea

The ninth annual session of the Korean Dental Association was held October 12 and 13, 1960, at Seoul. Han Dong Chan was installed as president. The association has recently moved to new offices. The address is No. 35, Nakeon-dong, Jongro-gu, Seoul, Korea.

Lee Han Soo has been elected president of the newly-formed Korean Academy of the History of Dentistry. Choi Jin Hwan, editor of the Korean Dental Press, is secretary, and the address of the academy is San 4-4, Hoigi-dong, Dongdaemun-gu, Seoul.

Choi Jin Hwan

SPEAKERS SOUGHT FOR APRIL DENTAL MEETING IN KOREA

Major Thomas J. King, representing the 38th Parallel Dental Society of Korea, has written

the American Dental Association, inviting speakers, clinicians and exhibitors to attend a spring meeting planned to be held in April 1961. The society consists of about one hundred Dental Corps members serving in Korea. Most of the dental officers are recent graduates. Korean colleagues also attend meetings of the society.

Major King, program chairman of the society, can be reached at Office, Chief Dental Service, 121st Evacuation Hospital, APO-20. San Francisco, Calif.

International News in General

PHILIPPINE DENTAL ASSOCIATION PLANS 53RD ANNUAL MEETING

The fifty-third annual meeting of the Philippine Dental Association will be held in Baguio City, Philippines, May 10-14. Baguio is the summer capital of the Philippines. It is situated on top of Mountain Province which gives it a delightfully cool climate throughout the year, and makes it an ideal site for the meeting which is scheduled for the summer month when it is hot in the lowlands.

Invitations are extended to all dental associations of all Asian countries and to the Dental Corps of the various branches of the United States Armed Forces of the Far East to present the latest trends in the art and science of dentistry.

Members of the American Dental Association especially are invited to contribute in the form of an essay, table clinic or projected clinic, or some other facet of dentistry. Forms to be filled out by all who wish to participate can be obtained by writing to Gory N. Casto, Jr., assistant secretary, American Dental Association, 222 E. Superior St., Chicago 11. Requests to participate must be made immediately.

General chairmen of the meeting are Bienvenido R. Yandoc and Luz C. Macapanpan. Co-chairmen of the committee on scientific sessions are Jesus Leyson and Gundina Manongdo-Asprer.

FRANCE TO ISSUE STAMP FOR FAUCHARD BICENTENARY

The National Committee for the Bicentenary of Pierre Fauchard announces that it has obtained from the French government the issuance of a postal stamp with his picture.

The observance of the death two hundred years ago of the "father of modern dentistry" will be celebrated by many activities, chief of which will be general meetings July 8 and 9 in the Grand Amphitheatre of the Sorbonne.

Secretary-general of the committee is Max Filderman, 67, rue de Tocqueville, Paris 17.

DENTISTS OF CHILE SEND THANKS FOR RELIEF AID

The Association has received a letter from the American National Red Cross, thanking American dentists for a contribution of $500 for relief to the dentists of Chile who were victims of the recent earthquakes in that country. "This action on the part of the American Dental Association typifies the generous spirit of many Americans whose neighborly actions are not limited by geographic boundaries," said Mr. Alfred M. Gruenther, president of the Red Cross. He said that a Committee for Relief of Stricken Dentists had been formed in Chile, under the chairmanship of Antonio Rodas, and that Dr. Rodas had written of the "profound gratitude" with which dentists of his country received the Association's contribution.

The American Red Cross representative in Chile has transmitted the Association's contribution to the secretary of the Committee for Relief of Stricken Dentists in Chile.

DENTAL SCHOOL OF THE UNIVERSITY OF BONN OPENS A NEW BUILDING COMPLEX

Four years ago, the faculty of the Dental School of the University of Bonn, Germany, recognized that the existing facilities were inadequate to cope with modern dental education. During World War II, the old school building was destroyed, and since 1946 the school had been housed in two adjacent apartment buildings. The erection of a new building complex, therefore, was essential.

On November 17, 1960, the new campus of the dental school, consisting of the school building, a dental clinic and polyclinic, and a dormitory for dental assistants, hygienists and nurses, was ceremoniously opened. A dental hospital will be built at a later stage.

Among the thousands of participants in the opening celebrations were the representatives of the federal and state government, of the dental associations and societies, and the deans of 17 German and 14 foreign dental schools. The facilities of the new building complex, designed by van Holy, prominent German architect, include large and small lecture rooms, seminar and research laboratories, study areas

devoted to oral surgery, orthodontics, pedodontics, periodontics, prosthodontics, public health dentistry and dental roentgenography. As a novelty in the design of dental schools, a series of small dental offices for general practitioners were added to teach students office procedures, business management and the organization of a modern dental practice. Two floors of the main building house the offices of the members of the faculty and the school administrators.

The Dental School of the University of Bonn will now be able to increase its enrollment to about 500 students and provide adequate facilities for postgraduate education. The school also will serve the general public in all aspects of dental care with the inclusion of an examination and treatment center for oral cancer.

PANAMA, CANAL ZONE GROUPS TO MEET JOINTLY FEB. 3, 4

The Dental Association of the Republic of Panama and the Panama Canal Zone Dental Society will meet jointly February 3 and 4. Sessions of scientific lectures will be held the first day at Balboa in the Canal Zone, and table clinics and exhibits are scheduled for the second day at the Union Club in Panama City. A dinner dance will conclude the meeting.

Carlos Anguizola is president of the Asociacion Odontologica Panameña and Juan R. Morales is chairman of the meeting.

INSTITUTE FOR DENTURISTS SHUT DOWN IN MUNICH

The German Dental Association (Bundesverband der deutschen Zahnärzte) recently closed the last existing institute for the education of denturists (Dentists) in Munich which, during the last decade, has trained more than 10,000 denturists to become dentists. Previously, the institutes for education in Cologne, Hamburg, Berlin, Hanover, Karlsruhe and Frankfurt had been closed, because the new German Dental Law (1960) terminated the profession of denturists, eliminating thereby the dualism —dentist and denturist—in the dental profession.

SWISS DENTAL CONGRESS IS SET FOR JUNE 1-4, 1961

The Swiss Dental Association (Société Suisse d'Odonto-Stomatologie) will hold its seventy-fifth anniversary congress June 1-4, 1961, in Basel. A preliminary program will be published shortly, according to Secretary Hans Michel, Basel, Switzerland.

DENTAL ART SHOW PLANNED FOR INTERNATIONAL CONGRESS

During the thirteenth International Dental Congress of the Fédération Dentaire Internationale, to be held July 7-14 in Cologne, Germany, an exhibition of works of art done by dentists will be held. It is intended to show in a comparatively modest setting paintings, sculpture, sketches and etchings, as well as works of literature and art.

Colleagues who wish to take part in this exhibition are asked to send either a transparency or, if possible, a colored reproduction of the exhibits (not smaller than 6 by 9 cm.) to Paul Jaeger, Munich 23, Nikolaistrasse 2/1, immediately.

Those who wish to take part will be notified immediately of the conditions attached to participation in this exhibition.

REGIONAL COMMITTEE OF W.H.O. TO DISCUSS DENTAL HEALTH

For the first time in its history, dental health will be the subject of the technical discussion of a Regional Committee of the World Health Organization. This decision was reached at the eleventh session of the WHO Regional Committee for the Western Pacific held in Manila in August.

The twelfth session will be held in 1961, at a date to be disclosed in the near future, in New Zealand. The Western Pacific WHO region is comprised of Australia, Hong Kong, Japan, Korea, Malaya, New Zealand, the Philippines and Viet Nam.

THIRD ASIAN DENTAL CONFERENCE TO BE HELD IN FALL IN JAPAN

The Third Asian Dental Conference will be held in Tokyo, Japan, in late October or early November of 1961. The conference is held every three years under the auspices of the Asian-Pacific Federation which is now affiliated with the Fédération Dentaire Internationale. The 1958 congress, the second, was held in Manila.

Further information can be obtained from B. B. Eraña, president of the Asian-Pacific Dental Federation, Manila Doctors Hospital. P.O. Box 372, Manila, the Philippines.

news of dentistry

Association Affairs

ALLOCATION OF DELEGATES TO THE HOUSE OF DELEGATES

The Association's House of Delegates is now limited to 416 members. Each constituent society and each federal dental service is given one delegate regardless of size. There are 54 constituent societies and five federal dental services, accounting for 59 delegates allocated without regard to membership.

The remaining 357 delegates are allocated to the 54 constituent societies proportionally to their number of active and life members. For example, a constituent society having 5 per cent of the active and life members in all constituent societies is allocated 5 per cent of the 357 delegates, plus one delegate not charged against proportional allocation.

The formula for proportional allocation usually produces a fractional number of delegates for each society, such as 6.51, 13.34 or 3.88 delegates. Of course, these fractional numbers have to be rounded to the nearest whole numbers, or 7, 13 and 4 delegates, respectively.

After rounding the numbers of delegates allocated proportionally for all states, it usually happens that the total is a little more or a little less than 357. It is then necessary to make an adjustment in one or more states. This is done by the "method of least relative error." By this method the adjustment is made in the states where the smallest percentage change in the unrounded figure will add or subtract a delegate.

In allocation of the delegates for 1960 the proper number was obtained at first adding so adjustment was not necessary. The methodology used comes as close to true proportional allocation of the 357 delegates as is possible without allocating fractions of delegates.

In the February issue of THE JOURNAL a breakdown of the number of delegates by states for 1961 will be published.

GENERAL COMMITTEE ON LOCAL ARRANGEMENTS FOR SESSION

The following have been named officers of the General Committee on Local Arrangements for the 1961 annual session of the American Dental Association in Philadelphia October 16-19:

General chairman, Jay H. Eshleman; vice-chairman, Albert L. Borish; secretary, Lawrence E. Hess; honorary officers, Lester W. Burket, James R. Cameron, George A. Coleman, LeRoy M. Ennis, Michael F. Quinn, William F. Swanson and Gerald D. Timmons.

The following are chairmen and vice-chairmen respectively of the committees named: reception, Victor H. Frank and William P. Manning; information serv-

ices, Thomas P. Fox and Charles P. Egoville; social functions, Robert W. Gick and Joseph V. Masino; clinics and motion pictures, Joseph E. Ewing and Harold E. Lantz; publicity, Vincent T. Buggy, Jr., and John P. Looby.

The committee on women's activities will be chairmanned by Mrs. Kenneth S. Smith. Mrs. William P. Manning will be vice-chairman and Mrs. Lester Burket, Mrs. W. F. Swanson and Mrs. Gerald Timmons will be honorary vice-chairmen.

HOSPITAL DENTAL SERVICE CONFERENCE AT NEW ORLEANS

The Association's Council on Hospital Dental Service will conduct a regional Conference on Hospital Dental Service January 16-18 at the Hotel Monteleone, New Orleans. Host society will be the Louisiana Dental Association.

On Monday, the opening day of the conference, a panel discussion on the responsibility of patient care will be held by John C. Mackenzie, M.D., administrator of Touro Infirmary, New Orleans, Frank Houghton, dean, Loyola University School of Dentistry, New Orleans, and a staff physician of Charity Hospital, New Orleans.

Gerard J. Casey, secretary of the Council on Hospital Dental Service, will speak on an effective state dental society program for developing hospital dental services; M. Fahy Jarrell, Alexandria, La., will discuss the responsibility of the individual dentist in the development of hospital dental services, and Madison B. Brown, M.D., American Hospital Association, will talk on the hospital staff and interprofessional relations.

Tuesday morning's session will have as its theme the training programs in hospital dental practice. Speakers will be James H. Quinn, chief of dental service, Ochsner Foundation Hospital, New Orleans; Patrick D. Toto, associate professor, chairman of oral diagnosis and prosthodontics, and director of research, Chicago College of Dental Surgery, Loyola University Dental School, and John Adriani, M.D., chief of anesthesiology section, Charity Hospital, New Orleans.

In the afternoon dentistry's contribution to the hospital program will be discussed by John G. Carr, secretary, New Jersey State Dental Association; Michael Arra, dental health director, Wisconsin Department of Health, and a member of the Blue Cross Commission staff.

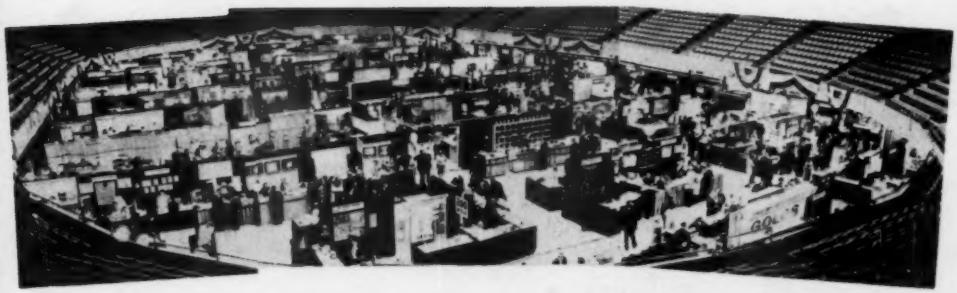
On the final day of the conference there will be a demonstration in hospital orientation for dentists at Charity Hospital, and talks by Walter V. Coburn, administrator, Bethany Hospital, Kansas City, Kan.; Fred A. Henny, president of the American Society of Oral Surgeons and director, oral surgery, Henry Ford Hospital, Detroit, and Mr. Bernard J. Conway, assistant secretary, Legal Affairs, American Dental Association.

17TH CONGRESS ON DENTAL EDUCATION AND LICENSURE

The seventeenth Congress on Dental Education and Licensure will be held February 4 in the Williford Room of the Conrad Hilton Hotel, Chicago. Its theme will be "Survey of Dentistry Recommendations Relative to Dental Education and Licensure."

The program will consist of panel discussions of four major recommendations of the Commission on the Survey of Dentistry. To be discussed will be the recommendations: (1) that the dental schools give students more experience in working with auxiliary personnel; (2) that the dental profession conduct studies designed to develop and expand the duties of auxiliary personnel; (3) that all state boards of dentistry accept the results of the National Board Dental Examinations, and (4) that dental schools make their curriculums more flexible and stimulating.

Leslie M. FitzGerald, chairman of the



This unusual picture of the commercial exhibits in the Los Angeles Sports Arena at the 1960 annual session of the American Dental Association is actually three shots in one. It was made by Mr. Theodore Berland of Chicago.

Association's Council on Dental Education, will moderate the morning session, and John E. Buhler, Council vice-chairman, will moderate the afternoon session.

DENTAL ABSTRACTS BEGINS SIXTH YEAR OF PUBLICATION

With the December issue of DENTAL ABSTRACTS in the hands of subscribers in 60 countries, the 1960 volume of this American Dental Association publication is complete. The December issue includes the subject and author indexes, and a list of the 270 publications from which articles were abstracted in 1960, with addresses.

Since DENTAL ABSTRACTS was launched by the American Dental Association in January 1956, five volumes have been published. They contain almost 5,000 abstracts of original articles appearing in 400 dental and related magazines in 60 countries and 21 languages. The five volumes constitute a matchless reflection of the state of dental practice, dental theory and dental research of our epoch.

Much of the material abstracted from nondental journals and from dental journals published abroad would not otherwise have been available to the English-language reader, or have been made available so soon.

Volume V of DENTAL ABSTRACTS contains 916 abstracts and illustrated digests, and also lists the titles of hundreds of Doctoral and Masters' dissertations submitted to the world's dental schools or graduate schools for advanced degrees.

Although the bulk of the abstracts are of interest to the general practitioner, all of the dental specialties are well-covered. Also well-represented is the research emanating from the world's dental research centers, hospitals and clinics.

The 1960 volume of DENTAL ABSTRACTS contains 59 abstracts or illustrated digests on anesthesia and analgesia. The totals for other subjects include: Anatomy, 5; anthropology, 6; bacteriology, 14; biochemistry, 35; case reports, 46; dentistry around the world, 14; dental education, 14; endodontics, 25; extractions, 15; forensic dentistry, 4; fractures, 9; general, 76; histology, 40; history, 8; hospital dental service, 5; oncology, 42; operative dentistry, 29; oral surgery, 48; orthodontics, 28; pathology, 59; pedodontics, 22; periodontics, 48; physiology, 22; prosthetic dentistry, 37; public health dentistry, 103; roentgenology, 37, and therapeutics, 60. Lesser numbers of abstracts also appear on such subjects as licensure, organization, plantation and physics.

The subscription to DENTAL ABSTRACTS is $8 a year in the United States, and $9

outside the United States. Single copies are $1 each. Readers may subscribe to the 1961 volume, beginning with the January issue, by writing the subscription department, American Dental Association, 222 E. Superior St., Chicago 11.

FOUNDERS' DAY AWARD TO L. W. MORREY FROM LOYOLA

Lon W. Morrey, editor of the American Dental Association, was the recipient of a Founders' Day award from Loyola University at ceremonies held December 12 in Chicago. Dr. Morrey, a graduate of the Chicago College of Dental Surgery, Loyola University School of Dentistry, was one of seven Chicagoans honored for their service to the community. He was cited in particular as a "leader in dental health education and dentistry for children."

RELIEF FUND, WITH HIGHER GOAL, PASSES HALFWAY MARK

With a goal of $125,000, a 25 per cent increase over the past few years, for the 1960-61 Relief Fund Campaign of the Association, contributions as of November 30, 1960, totaled 57 per cent.

Alaska, Arizona and Tennessee are the first constituent societies to reach or exceed their quotas. In addition, Arizona is the first in which every member of the state society contributed to the fund.

The amount which has been donated so far is $72,394.49.

UNIVERSITY OF NEBRASKA HONORS FRITZ PIERSON

Fritz A. Pierson, Trustee of the Eleventh District of the American Dental Association, and secretary of the Nebraska State Dental Association, is the recipient of the 1960 distinguished service award of the University of Nebraska Dental Alumni Association.

The award was presented October 28 by Robert Krejci, Lincoln, Neb., president of the Dental Alumni Association, at a homecoming celebration in Lincoln.

A 1917 graduate of the College of Dentistry, University of Nebraska, Dr. Pierson was elected secretary of the state association in 1930; he has served in that position continuously except for a term as president of the association. In 1953 he served as president of the American College of Dentists. He joined the staff of the College of Dentistry in 1922; since 1932 he has held the rank of professor of dental medicine and now is the senior member of the faculty. He has served as a member of the board of directors of the Lincoln Chamber of Commerce and is a past director of the Lincoln Y.M.C.A.

ACCEPTED DENTAL REMEDIES FOR 1961 NOW AVAILABLE

The Association's Council on Dental Therapeutics announces that the 1961 edition of *Accepted Dental Remedies* is now ready for distribution. The book includes provisions for acceptance of products, a general index, a distributors' index, index of current reports from the Council and the Division of Chemistry, and an index of more recent reports on products not listed in the book, including those classified in Groups B, C and D. The price is $3 and it may be ordered from the Order Department of the Association, 222 E. Superior St., Chicago 11.

Dental Societies

TWO INNOVATIONS AT CHICAGO MIDWINTER MEETING FEB. 5-8

A new presentation at the Midwinter Meeting of the Chicago Dental Society will be two all-day workshops devoted to individual segments of dentistry. The ninety-sixth annual meeting will be held February 5-8 at the Conrad Hilton Hotel.

On Monday, February 6, the workshop

program will be devoted to complete dentistry under the direction of Ernest Granger of New York City. Tuesday's program will be on crown and bridge prosthetics under the leadership of Stanley D. Tylman of Chicago.

Another "first" will be the celebration of Children's Dental Health Day to take place at 2 P.M. Sunday, February 5, at McCormick Place, the city's new convention hall. This program will include entertainment.

Edward J. Sullivan, general chairman, announces that registration will begin at 10 A.M. Sunday in the Normandie Lounge of the hotel. Those attending must show their American Dental Association membership cards.

Social events for the Midwinter Meeting include a Ladies' Luncheon and fashion show for the benefit of Children's Memorial Hospital Tuesday noon, and an evening of dancing and entertainment Wednesday. The President's reception, in honor of James Lynch, will be held in the Grand Ballroom starting at 5 P.M. Sunday.

President Charles H. Patton of the American Dental Association (right) presents a scroll of felicitation from the Association to Gerald I. Shapiro, president of the First District Dental Society of the State of New York, at its centennial banquet November 11, 1960, at the Hotel Pierre, New York City.

NEW YORK FIRST DISTRICT ISSUES CENTENNIAL JOURNAL

To commemorate its centennial year, the First District Dental Society of New York has published a 52-page *Centennial Journal*. Edited by Joseph H. Kauffmann, the attractive publication describes the many centennial projects, ranging from the society's meeting held March 7, 1960, to the Veterans Day banquet of November 11, 1960, at which the principal speaker was the Hon. William O. Douglas, Associate Justice of the Supreme Court of the United States.

The journal contains a 17-page history of the First District Dental Society, greetings, a brief history of the society's *New York Journal of Dentistry*, a description

Civilian and military doctors of dental medicine convened at the thirty-sixth annual Greater New York Dental Meeting in December. Maj. Gen. Joseph L. Bernier (center), chief, Army Dental Corps, is seen with Charles H. Patton (right), president of the American Dental Association, and David Tanchester, chairman of the meeting.

Obed H. Moen, president of the Fédération Dentaire Internationale and former chairman of the Association's Council on International Relations, inspects portrait of himself presented by the Jefferson County (Wis.) Dental Society.

of New York dentistry in 1960, a listing of past presidents, and a list of life members, members of the centennial committee, and current officers of the society.

OBED MOEN HONORED BY UNIT OF WISCONSIN STATE SOCIETY

Obed H. Moen, Watertown, Wis., was honored by a testimonial dinner in November by the Jefferson County (Wis.) Dental Society for "the services he has rendered to dentistry and to mankind," as stated by H. F. Petternell, Fort Atkinson, president of the component society.

Dr. Moen, elected last June to his second term as president of the Fédération Dentaire Internationale, has been president of the Wisconsin State Dental Society, Trustee of the American Dental Association for the maximum period of six years, and a member of the Council on International Relations of the Association for six years, including the last three as chairman.

More recent international recognition of Dr. Moen includes his receiving honorary membership in the Norwegian Dental Association and an honorary Doctor of Laws degree from the National University of Ireland.

As a gift from all members of the Jefferson County Dental Society, Dr. Moen was presented an oil painting of himself, done by Mr. William Unger of Fort Atkinson, formerly of Vienna, Austria.

JESERICH RECIPIENT OF 1960 CALLAHAN MEMORIAL AWARD

Paul H. Jeserich, immediate past president of the American Dental Association, has been named the 1960 recipient of the Callahan Memorial Award presented by the Ohio State Dental Association.

The award, for "a contribution to dental science which is of very exceptional value," has been made each year since 1922 with the exception of the year 1945. Last year's award was presented to H. Trendley Dean, former secretary of the Association's Council on Dental Research, also formerly director of the National Institute of Dental Research, Bethesda, Md.

COUNTY SOCIETY TO HONOR PRESIDENT PATTON AT DINNER

The Philadelphia County Dental Society will honor Charles H. Patton, president of

the American Dental Association, at a dinner Wednesday, March 1.

Thomas P. Fox and Joseph V. Masino are co-chairmen of the committee in charge of arrangements. All Association members wishing further information are asked to contact the county society, Sheraton Hotel, Philadelphia 3.

Dental Education

FRESHMAN DENTAL SCHOOL ENROLLMENT SHOWS INCREASE

An increase of about 2 per cent in enrollment for the 1960 freshman dental classes has been reported in contrast to the 1 per cent decrease shown for the 1959 freshman class. As of September 1960, there were 3,637 first year students enrolled in the 47 dental schools of the United States and Puerto Rico. There were 3,573 freshmen in 1959, 3,607 in 1958 and 3,600 in 1957.

If the number of students taking the dental aptitude tests in October 1960 is any index, the 1961 freshman class also can be expected to show an increase. The 1,561 students taking the tests during this period is a 17 per cent increase over the number in 1959. California is listed as the permanent address for the largest number of students taking the battery of tests in October 1960, with New York and Texas listed respectively for the second and third largest groups.

The Council on Dental Education and the Association are on record advocating a need for more attention to the problem of recruiting a greater number of well-qualified dental students as well as students for the auxiliary fields. These increases may well reflect the effort which has already been made in finding new ways of telling students about the profession of dentistry. Today, there are many more professions and occupations than there were just a few years ago, competing for the best students that the colleges and universities produce.

Five dentists, all members of the Monmouth County (N.J.) Dental Society, recently were honored by the society at a dinner. The five, representing 277 years of dentistry, are (left to right) Samuel Loveman, Toms River, 50 years; E. B. Stillwell, Spring Lake, 52 years; Owen Woolley, Long Branch, 59 years; Herbert Williams, Red Bank, 63 years, and Frederick Newman, Red Bank, 53 years. Dr. Williams holds gift radio, given by the society to each of the five.

DENTAL EDUCATION FUND HAS AWARDS FOR FELLOWSHIPS

Four teaching fellowships paying a stipend of $3,600 to $5,000 will be available from the Fund for Dental Education during 1961 to persons wishing to prepare themselves for careers in dental education, Maynard K. Hine, Fund president, has announced.

Application for these fellowships may be made during the first quarter of 1961 on forms secured through the dental school deans or direct from the Fund office at 840 N. Lake Shore Dr., Chicago 11.

With the addition of two fellowships recently established, the following awards are available to dentists or dental seniors planning to enter dental teaching: the American Dental Association Teaching Fellowship of $5,000 sponsored by The Great-West Life Assurance Company; the American Dental Trade Association Teaching Fellowship of $3,600, and two Funds for Dental Education Teaching Fellowships of $3,600.

Applicants must be graduates of dental schools in the United States or Canada and must be prepared to submit academic records showing they are qualified to enroll in graduate dental education programs. They are required to sign a statement indicating they expect to become dental teachers on completion of the fellowship training.

BOSTON U. OFFERS VARIETY OF GRADUATE COURSES

The department of stomatology of Boston University School of Medicine offers graduate courses in five fields described as follows:

A one-year course in oral surgery under the direction of Kurt Thoma; two year course in orthodontics under the direction of Herbert I. Margolis; one or two year course in prosthetics under the direction of Leo Talkov; one year course in endodontics under the direction of Herbert Schilder; two year course in oral pathology given in connection with the pathology department of the Massachusetts Memorial Hospitals.

Application forms and further information can be obtained by writing to the school at 80 E. Concord St., Boston 18.

ENDODONTICS FELLOWSHIP AT TEMPLE DENTAL SCHOOL

Applications are now being accepted for the position of research Fellow and clinical instructor in the department of endodontics at the Temple University School of Dentistry.

The position offers the applicant an opportunity to pursue research projects related to endodontics and at the same time to instruct students in clinical endodontic technics.

The applicant must be available by August 1; remuneration is $5,200 a year. Complete information as to training, interest and clinical experience should be sent to Leonard Parris, Temple University School of Dentistry, Broad St. Above Allegheny Ave., Philadelphia 40.

FELLOWSHIPS AVAILABLE AT MEDICAL COLLEGE OF VA.

Because of graduations the Medical College of Virginia will have fellowships available leading to M.S. or Ph.D. degrees in the basic sciences.

These fellowships are supported by funds from the National Institute of Dental Research, United States Public Health Service, and allow a stipend of $5,500 for dental graduates. Qualified applicants will be considered for degrees in anatomy, chemistry, microbiology, pathology and pharmacology. According to wishes of trainees a reasonable amount of clinical training may be included.

Further information can be obtained by writing to the director, Graduate and Postgraduate Studies, School of Dentistry, Medical College of Virginia, Richmond.

RESEARCH FELLOWSHIPS IN PERIODONTOLOGY AT TUFTS

Two fellowships intended for graduate dentists interested in research and teaching careers in periodontology now are available at the Tufts University School of Dental Medicine.

In addition to participation in an extensive research program, the fellowships offer training in periodontal pathology and an opportunity for preparing for advanced degrees. There is an annual stipend of $5,000 and the fellowships, to begin in September, are renewable.

Additional information and application forms can be obtained from Irving Glickman, periodontology department, 136 Harrison Ave., Boston 11.

PHILADELPHIA GEN. HOSPITAL OFFERS ONE-YEAR INTERNSHIP

The Philadelphia General Hospital offers a one-year rotating internship in dentistry. This program is approved by the American Dental Association.

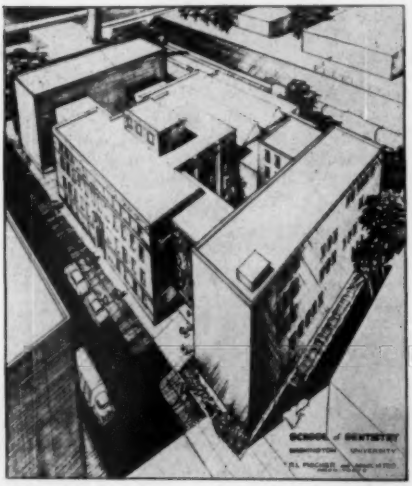
A new air-conditioned dental clinic has been completed, consisting of 21 chairs, 10 dental units, 2 x-ray machines, a clinical research laboratory, intercommunication system, closed circuit television and a prosthetics and orthodontics laboratory.

Application forms can be obtained by writing to Fred J. Lucchesi, chief, department of dentistry, Philadelphia General Hospital.

RESEARCH AND TEACHING TRAINEESHIPS AT U. OF P.

Research and teaching traineeships in the basic sciences, in periodontology and in the comprehensive treatment and rehabilitation of the cleft palate patient are available at the School of Dentistry, University of Pennsylvania.

All traineeships are supported by the United States Public Health Service. Annual stipends vary from $4,500 up depending on the qualifications and needs of the successful candidates. Inquiries for the basic science and cleft palate traineeships should be sent to the chairman, Committee on Traineeships and Fellowships, University of Pennsylvania, School of Dentistry, 4001 Spruce St., Philadelphia 4. Inquiries for the traineeships in periodontology should be sent to the dean, Graduate School of Medicine, 237 Medical Laboratories, University of Pennsylvania, Philadelphia 4.



Architect's drawing of the $700,000 research addition to the School of Dentistry of Washington University in St. Louis. The present building is shown in the center with the new addition in the lower right. Construction was scheduled to begin the first of the year.

MANY SCHOOLS OFFER FINE POSTGRADUATE COURSES

Alabama • The School of Dentistry of the University of Alabama has scheduled a refresher course on complete denture prosthesis to be given March 10-12 by William L. McCracken. Further information can be obtained from the director of the refresher course program of the school at 1919 Seventh Ave. S., Birmingham 3.

Albert Einstein College of Medicine • The Department of Dentistry of the Albert Einstein College of Medicine of Yeshiva Univer-

sity, Eastchester Rd. and Morris Park Ave., Bronx 61, N. Y., announces the following courses:

Anesthesiology, premedication, comedication and supportive therapy, April 6 and 7, Stanley R. Spiro and associates; endodontics, February 22-24, Julius Fox and associates; dento-alveolar surgery, May 4 and 5, Herbert Calman, Stanley J. Behrman, William Rakower and associates; oral pathology and general practice, March 24 and March 31, Ernest Baden; periodontics, ten Wednesdays beginning March 1, Marvin N. Okun, Irving Yudkoff and associates; prosthodontics, Friday mornings, March 3, 10, 17, 24 and 31, Lester E. Rosenthal and Max A. Pleasure.

Boston • The Department of Stomatology, Division of Graduate Studies, School of Medicine, Boston University, and the Massachusetts Memorial Hospitals announce the following courses:

Oral pathology for oral surgeons, March 6-10, Jack Bloom, Kurt Thoma, Henry M. Goldman and staff; apicoectomy, surgical endodontic procedures, April 10-14, Herbert Schilder; periodontal therapy, April 24-29, Henry M. Goldman, Bernard S. Chaikin, Gerald M. Kramer, William Pendergast, Jack Bloom and associates; advanced course in periodontal therapy, April 24-29, Henry M. Goldman, Bernard S. Chaikin, Gerald M. Kramer, William Pendergast and associates; full mouth reconstruction, May 15-19, Leo Talkov, David J. Baraban, Henry M. Goldman, Bernard S. Chaikin, Gerald M. Kramer and J. David Kohn; surgical procedures in periodontal therapy, May 22-26, Lewis Fox and associates.

California • The University of California School of Dentistry, San Francisco, offers the following postgraduate courses: seminar in oral medicine, Thursday evenings from February 9 through March 16, Sol Silverman and William H. Ware; orthodontic principles in general dental practice, February 3 and 4, J. Rodney Mathews and Eugene E. West; complete denture construction, Tuesday afternoons from January 17 through March 21, George A. Hughes; dynamics of periodontics, February 24 and 25, Perry A. Ratcliff and R. Earl Robinson; pulp protection and pulp preservation, March 3 and 4, Maury Massler; complete denture construction (demonstration course), March 16-18, Bernard Jankelson; partial denture prosthesis (participation course), March 24 and 25, Carl P. Regli.

New York • The New York University College of Dentistry will give a course in periodontics and an oral medicine refresher from 2 to 4 P.M. Wednesdays from March 1 through May 10, directed by Sidney Sorrin and associates. The address is 421 First Ave., New York 10.

Pennsylvania • Six postgraduate courses are listed for the University of Pennsylvania School of Dentistry. They are: prosthetic relations of the temporomandibular joint, January 16-20, Ernest R. Granger and associates; diagnosis and treatment planning, March 6-10, Lester W. Burket, Alvin L. Morris and Roy T. Durocher; practical and simplified procedures in crown and bridge prosthesis, March 13-17, Charles B. Sceia; complete denture prosthesis, March 27-30, Vincent R. Trapozzano; endodontics, April 10-21, Louis I. Grossman and associates.

Further information can be obtained by writing to the school at 4001 Spruce St., Philadelphia 4.

Pittsburgh • The following courses are sponsored jointly by the University of Pittsburgh School of Dentistry and the Odontological Society of Western Pennsylvania:

Crown and bridge prosthodontics, February 9-11, Henry M. Tanner; complete denture construction, March 15-18, Ernest T. Lewis; endodontic therapy, six Wednesday evenings beginning March 15, Andrew E. Michanowicz and Walter P. Auslander; periodontal therapy, April 12-14, D. Walter Cohen, assisted by Herbert E. Meyers; periodontal therapy (clinical demonstration), April 15, D. Walter Cohen, assisted by Herbert E. Meyers; orthodontics in periodontal therapy, January 18-20, Jack Alloy and Maxwell Fogel.

Hollis W. Zwicker, 547 North Ave., Pittsburgh 9, is the chairman of the society's postgraduate committees.

Temple • Temple University School of Dentistry, 3223 N. Broad St., Philadelphia 40, offers the following courses: implant dentures, January 9-13, Aaron Gershkoff and Norman I. Goldberg; anatomy—head and neck dissection, Wednesdays from February 1 through May 17, Richard M. Snodgrasse; advanced fixed prosthesis, February 6-11, George Straussberg; periodontics, Tuesdays from February 14 through April 18, Jacoby T. Rothner and staff; practice administration, February 18, Jay H. Eshleman; periodontal prosthesis, February 21-24, Morton Amsterdam and D. Walter Cohen; immediate surgical endodontics, March 6-10, Leonard Parris, assisted by Harold Rappaport and Robert Uchin.

Tufts • A special participation course in perio-

dontology will be given April 24-28 at the Tufts University School of Dental Medicine, 136 Harrison Ave., Boston 11. The course will be taught by Irving Glickman and staff.

Washington • Refresher courses scheduled at the University of Washington School of Dentistry include the following: dental therapeutics and prescribing, January 14 and 15, James M. Dille, John D. Gehrig, John I. Ingle and William M. Kirby; pedodontics, February 6-8, F. L. Jacobson, David B. Law, Myron Warnick, Alexander H. Bill, William Humphrey, T. M. Lewis and Richard Philbrick; modern concepts in periodontics, February 14-16, Saul Schluger and Leo Sreebny; compound amalgam restorations, February 24-26, F. Lloyd Jacobson; modern concepts in successful practice management, March 6 and 7, Cecil H. Bliss.

National Defense

ARMED FORCES INSTITUTE TO PRESENT "ORAL PATHOLOGY"

The Armed Forces Institute of Pathology will present its annual course, "Pathology of the Oral Regions," April 10-14 in Washington, D. C. The course will consist of the pathology of the oral mucosa and jaws as well as oral manifestations of systemic disease. There are no fees for the program.

Quotas have been established for both civilian and military personnel. Members of the Federal Services should apply through their respective services. Civilians interested in enrolling in the course can apply to the director, Armed Forces Institute of Pathology, Washington 25, D. C.

NAVY ADDS NEW EXTENSION COURSES FOR OFFICERS

Extension courses in Operative Dentistry (NAVPERS 10759) and Dental Department Administration (NAVPERS 10736-A) are now available to dental officers of the United States Navy and Naval Reserve. These courses were developed by the staff of Naval Dental School with the assistance of professional test writers of the Home Study Department of the University of Chicago. The course in operative dentistry, primarily a refresher course, is comprised of six assignments.

On December 1, 1960, Capt. E. G. F. Pollard, Commanding Officer, Naval Dental School, was promoted to the rank of Rear Admiral. A native of Cleveland, Dr. Pollard was graduated from the University of Minnesota School of Dentistry and has served in the U. S. Navy for 24 years. He received the Legion of Merit for his service as anesthetist and assistant surgeon of the prisoners' medical team and for his dental treatment to fellow prisoners while a prisoner of war of the Japanese Army during World War II.

The course in dental department administration is a 12-assignment course and is designed to inform the dental officer of his duties and of the policies and practices of the Department of the Navy and Bureau of Medicine and Surgery as they are related to the efficient organization, management and administration of a dental department.

Applications for enrollment should be submitted on NAVPERS 992, Application for Enrollment in Officer Corre-

spondence Course, via official channels to the Commanding Officer (Code 5), U. S. Naval Dental School, National Naval Medical Center, Bethesda 14, Md.

LOUIS S. HANSEN FIRST NAVY INSTITUTE DIVISION HEAD

Louis S. Hansen

Capt. Louis S. Hansen, U. S. Navy, has been appointed chief, Dental and Oral Pathology Division, Armed Forces Institute of Pathology, Washington, D. C. He is the first naval officer to head an Institute Division. Dr. Hansen relieves Maj. Gen. Joseph L. Bernier, U. S. Army, who recently was detached to assume the duties of chief, Army Dental Corps.

A veteran of 19 years of naval service, Captain Hansen was graduated from the University of Southern California School of Dentistry, and received his Master of Science Degree from Georgetown University. His last duty station was the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Md., where he was engaged as a dental researcher and an instructor in oral pathology.

STERLING V. MEAD FETED AT NAVY DENTAL CORPS DINNER

Sterling V. Mead, Washington, D. C., oral surgeon and former president of the American Dental Association, was honored at a testimonial dinner November 9 at the Commissioned Officers' Mess, National Naval Medical Center, Bethesda, Md.

Tribute was paid Dr. Mead for his outstanding contributions to the dental profession and the Navy Dental Corps by many prominent dentists, educators and officers of the Navy. Congressman L. Mendel Rivers of South Carolina, who introduced the legislation in Congress that ultimately resulted in autonomy for the Navy Dental Corps, spoke of his close friendship with Dr. Mead and of the re-

Congressman L. M. Rivers, S. C., is seen addressing 180 officers of the U. S. Navy Dental Corps who honored Sterling V. Mead (left) with a testimonial dinner recently. Dr. Mead, Washington, D. C., is an oral surgeon and former president of the Association. Rear Admiral C. W. Schantz was the principal speaker of the evening. Mrs. Mead is seen at the right.

Maurice J. Saklad of New York City (left) recently lectured on recommended procedures for prosthodontic problems requiring esthetics to the staff, resident and postgraduate dental officers at the U. S. Naval Dental School, National Naval Medical Center, Washington, D. C. Seen with him is Capt. G. W. Ferguson, head of the Officer Education and Training Department, Naval Dental School.

spect he himself holds for Navy dentists.

Main speaker of the evening was Rear Admiral C. W. Schantz, chief of the Navy Dental Corps, who concluded with a tribute to Dr. Mead and presented him with a plaque for his success in promoting legislation which has increased the effectiveness of the Navy Dental Corps.

General

DENTAL TRADE UNIT SUPPORTS STUDENT RECRUITING PROGRAM

At a recent meeting in Chicago of the Board of Directors of the American Dental Trade Association a resolution was passed stating that the association "shared the concern of the dental profession and dental educators at the need to recruit a sufficient number of qualified applicants for dental schools and for the training of auxiliary dental personnel." The resolution further stated that the ADTA would assist, wherever possible, in the implementation of the profession's student recruitment program.

ASSISTANTS' SEMINAR ON USE OF AUXILIARY PERSONNEL

Utilization of auxiliary personnel in correct dental practice administration will be the theme of an all-day seminar to be conducted February 5 in the Grand Ballroom of the Sheraton-Blackstone Hotel, Chicago.

Miss G. Archanna Morrison will conduct the seminar which is in conjunction with the Chicago Midwinter Dental Meeting, Feb. 5-8.

Luncheon is included in the fee of $10 for the all-day session. Further information can be obtained by writing to Miss Ruth Shipley, program chairman, 848 Hinman Ave., Evanston, Ill. The Chicago Dental Assistants Association is the sponsoring society.

AMERICAN EDUCATION COUNCIL DISTRIBUTES SURVEY SUMMARY

The Central Office of the Association has been receiving a considerable number of requests for copies of the Summary Report of the Survey of Dentistry from members throughout the country.

These reports are available only from the American Council on Education, 1785 Massachusetts Ave., N.W., Washington 6, D.C., at a cost of $1 each.

The Association does not have copies available for distribution and has so informed all those who have already requested them.

1962 ALBERT JOACHIM PRIZE CONTEST OPEN UNTIL JULY 1

Manuscripts from candidates for the Albert Joachim International Prize must be received by the secretary general of the

Fédération Dentaire Internationale, 35 Devonshire Place, London, W. 1, England, not later than July 1, 1961. These will be considered by the international jury appointed by the Fédération and the award will be made at the Thirteenth International Dental Congress to be held in Cologne, Germany, July 7-14, 1962.

Attention is drawn to the fact that the rules for this prize have now been amended and as a result both published and unpublished theses on original scientific research of a laboratory or clinical nature in the field of odontostomatology carried out not longer than five years previous to July 1961 are eligible for the prize.

The 1962 award will be 50,000 Belgian francs (about $1,000). The complete set of rules is obtainable on request to the secretary general of the FDI.

TESTIMONIAL DINNER FOR E. L. BALL AT CINCINNATI

Edward L. Ball will be given a testimonial dinner Monday, January 9, at the Hotel Netherland Hilton in Cincinnati, by the Cincinnati Dental Society. Floyd E. Lytle is chairman of the arrangements committee and representatives of the various societies and academies with which Dr. Ball is affiliated will speak briefly on his contributions to the profession. Lon W. Morrey, American Dental Association editor, will represent the Association at the affair.

TWO ALUMNI GROUPS PLAN MIDWINTER LUNCHEONS

The Alumni Association of Northwestern University Dental School will hold a luncheon meeting at noon, Wednesday, February 8, in the Grand Ballroom of the Conrad Hilton Hotel, Chicago, in conjunction with the Chicago Midwinter Dental Meeting. A brief tribute will be paid at this time to former dean, Charles W. Freeman, who died last year.

On the same day, the University of Illinois Dental Alumni Association will hold its annual luncheon in the Beverly Room of the Conrad Hilton Hotel. Past presidents will be honored as well as those classes holding reunions. Any class interested in a reunion should contact the Alumni Office, 1854 W. Polk St., Chicago 12, to make arrangements. The association will maintain a hospitality room in the hotel during the Midwinter Meeting under the chairmanship of Paul Bostain.

ORAL SURGEONS PLAN SESSION ON PRACTICE ADMINISTRATION

The first conference on practice administration in oral surgery will be sponsored by the American Society of Oral Surgeons in Chicago February 3 and 4 at the American Hospital Association Building.

Speakers will include Walter L. Eckardt of Clayton, Mo.; Victor H. Frank of Philadelphia; Harry Klenda, Wichita, Kan., and William E. Hall, Pittsburgh.

The conference is planned and offered by the Committee on Continuing Education of the ASOS to which Maynard K. Hine, dean, Indiana University School of Dentistry, serves as consultant.

GEORGIA HEALTH BOARD HEADED BY J. G. WILLIAMS

James G. Williams of Atlanta has been appointed to the post of chairman of the State of Georgia Board of Health. In this capacity Dr. Williams will share responsibility for the state hospitals, with a population of 20,000 patients and 500 employees, as well as aid in the administration of an annual budget of 40 million dollars.

SOCIETY TO HOLD PROGRAM ON DENTAL ANESTHESIA

The Illinois Section of the American Dental Society of Anesthesiology is offering a one-day program entitled "Recent Advances in Dental Anesthesia" February 5, immediately preceding the Midwinter

Meeting of the Chicago Dental Society.

Discussion will center on premedication in local and general anesthesia, sedation in children, evaluation of the newer local anesthetics and the management of anesthetic emergencies. Participating will be Morgan Allison, Edward Dobbs, Leonard Monheim and Stanley Spiro.

Further information can be obtained from E. Stuebner, 808 S. Wood St., Chicago 12.

DENTAL RESEARCH UNIT PLANS ANNUAL SEMINAR AT CHICAGO

The Chicago Academy of Dental Research will hold a seminar on periodontics February 4 and 5 preceding the Midwinter Meeting of the Chicago Dental Society. Henry M. Goldman will be the clinician at the sessions which will be held at the Conrad Hilton Hotel. Details can be obtained from Sanford Schaffner, 10 N. LaSalle St., Chicago 2.

OVER 100 GROUPS IN DENTAL FIELD IN "HEALTH CAREERS"

The National Health Council has released figures that show that of the organizations represented in the membership of state and local Health Career committees, substantially over 100 are affiliated groups in the dental field.

From the American Dental Association, 55 affiliated societies, on both the state and local level, participate. The American Dental Assistants Association has 32 groups in the program, and the American Dental Hygienists' Association also has 32. The Women's Auxiliary of the American Dental Association is represented by six groups.

The American College of Dentists also participates in this "grass roots" program of stimulating interest in health careers.

LOYOLA ALUMNI GROUP TO HAVE HOSPITALITY SUITE

A suite, 512A, in the Conrad Hilton Hotel, Chicago, will be maintained as a hospitality center for members of the Dental Alumni of Loyola University during the Chicago Dental Society's Midwinter Meeting February 5-8.

Edward Kritzke, vice-president of the alumni group and chairman of arrangements, announces that a cocktail party will be held Tuesday, February 7, from 5 to 8 P.M. in the Waldorf Room of the hotel.

Also • William R. Alstadt, Little Rock, Ark., a past president of the Association, participated in a "medical careers night" at the University of Arkansas Medical Center which was attended by about 350 high school pupils. . . . William J. Updegrave, professor of radiodontics at the Temple University School of Dentistry, received the Honor Award presented by the General Alumni Association of Temple University for the School of Dentistry. . . . J. Eugene Ziegler was the recipient of the 1960 Dedication Award of the Los Angeles County Dental Society saluting his career as a dentist and dental educator. . . . Willard Camalier, Jr., M.D., son of the Association's assistant secretary, Washington, D. C., office, was awarded a Certificate of Meritorious Service by the Medical Society of the District of Columbia. . . . Herbert I. Margolis has been appointed professor of orthodontics at Boston University School of Medicine. . . . Arthur H. Bulbulian, director of the Mayo Foundation Museum of Hygiene and Medicine, and assistant professor of medical education in the Mayo Foundation, Graduate School, University of Minnesota, has been appointed an associate editor of *The Journal of Prosthetic Dentistry*, as a representative of the American Academy of Maxillofacial Prosthetics.

A. Jack Terrill is president of the Montana State Dental Association and a general practitioner in Great Falls. Dr. Terrill received his D.D.S. in 1939 from the School of Dentistry of the University of Minnesota. He has served as secretary, vice-president and president of the Fourth District Dental Society. He is a member of the Society of Dentistry for Children, a Fellow of the American College of Dentists, a Shriner, a Mason and a member of the Scottish Rite. Dr. Terrill also is a member of the Rotary Club and of the Elks Club. In 1949 he served on the local school board. He has presented table clinics on pedodontics. He is married and the father of two sons, William Arthur, 21, and Richard Gregory, 17. His hobbies are fishing, hunting and spectator sports.

Thomas A. Ward is president of the Wyoming State Dental Association and a general practitioner in Casper. After attending the University of Wyoming, Dr. Ward received his D.D.S. from Washington University School of Dentistry in 1938. He served as secretary and treasurer of his state association from 1948 to 1950, and was president of the Wyoming State Board of Dental Examiners from 1950 to 1955. Dr. Ward is a member of the American Society of Dentistry for Children. He is married and the father of Andrea Louise, 17, and Thomas A., Jr., 8. His hobbies are fishing and travel.

Earl L. Wade, president of the Maine Dental Association, is a general practitioner in Bath. He received both his B.S. and his D.D.S. degrees from the University of Kansas City in 1942. Dr. Wade is a Fellow of the International College of Dentists, a member of the Masonic Order and of the Rotary Club. He was a part-time instructor in anatomy at his alma mater. Dr. Wade interned in oral surgery in 1942-1943 at the Kansas City General Hospital, and served as resident in oral surgery at that hospital the following year. He is married and the father of two children, Teri-Lee, 14, and Donna Louise, 12. His hobbies are salmon fishing and bird hunting.

Charles F. Moore, a general practitioner in Seaford is president of the Delaware State Dental Society. He attended the University of Delaware, and graduated from the University of Maryland Dental School in 1946. Dr. Moore is a member of the Kent-Sussex Dental Society and the Pierre Fauchard Academy. He was a Lieutenant (j.g.) in the U. S. Navy Dental Corps in 1946 and 1947. He is a member of the American Legion, was president of the Delaware State Board of Health in 1956, and served in the Delaware Legislature during 1951-1953. Married, Dr. Moore is the father of three-year-old Marcia Monroe. His hobbies are reading, hunting, fishing and photography.

Douglas A. Browning is president of the Maryland State Dental Association. Dr. Browning, a general practitioner in Baltimore, attended the University of Maryland, and obtained his D.D.S. from the Baltimore College of Dental Surgery in 1934. He has served as chairman of various committees of both the Baltimore City Dental Society and the Maryland State Dental Association. He interned for one year at the University Hospital, University of Maryland. He served overseas as a major with the Maryland 142nd General Hospital Unit (University of Maryland) from 1942 to 1945. Dr. Browning is a member of Omicron Kappa Upsilon, the Gorgas Odontological Society and the Masonic Order. Married, he is the father of Mary Lynn, 14, and Douglas, Jr., 11. His hobby is golf.

John B. Hirsch, president of the Nevada State Dental Society, is a Las Vegas general practitioner. He attended Los Angeles City College, and received his D.D.S. degree from Creighton University School of Dentistry, Omaha, Neb., in 1941. Dr. Hirsch has served as president of the Clark County Dental Society. He is married and the father of three—Diane, 15, Patricia, 11, and Kathleen, 4. Dr. Hirsch has an interest in prosthetic dentistry. His hobbies are fishing, golf, bowling and photography.

1960-1961

State Dental Association Presidents

A. Jack Terrill
Montana

Thomas A. Ward
Wyoming

Earl L. Wade
Maine

Charles F. Moore
Delaware

Douglas A. Browning
Maryland

John B. Hirsch
Nevada

reports of councils and bureaus

Basic standards of hospital dental service

COUNCIL ON HOSPITAL DENTAL SERVICE

The purpose of the "Basic Standards" is to provide hospital administrators, chiefs of dental service and dentists interested in the organization and conduct of dental services in hospitals with standards that have been approved by the American Dental Association for such a program.

The Council periodically reviews and recommends amendment of the Basic Standards in light of its experience in inspecting and accrediting hospital dental services. At the 1960 annual session in Los Angeles the House of Delegates approved amendments to the Standards.

Following is the amended "Basic Standards" under which inspections and approvals of dental services in hospitals are evaluated:

INTRODUCTION

The dental profession knows that the health care it renders is an essential part of a total health service. It has long recognized, as well, that its services must be well integrated with those of the other health professions in order to provide this total health service for the individual patient. The modern hospital, marshalling as it does many professions, services and facilities, provides a great challenge and opportunity for interprofessional cooperation in the service of the individual patient.

For these reasons, the American Dental Association has established the Council on Hospital Dental Service to act on its behalf in the inspection and improvement of dental services in the hospital. The Council on Hospital Dental Service examines dental services in hospitals and issues certificates of accreditation in the name of the American Dental Association to hospitals which have dental services which meet certain standards.

In establishing standards, the Council on Hospital Dental Service has kept in mind the need of relating them to prevailing standards in the field of hospital administration and practice. It has endeavored to establish only broad general principles within which the best interests of the patient are served.

APPLICATION FOR APPROVAL OF A HOSPITAL DENTAL SERVICE

Application for the approval of a hospital dental service should be made to the Council on Hospital Dental Service, American Dental Association, 222 East Superior Street, Chicago 11, Illinois. Inspection of the dental service will be made without cost to the hospital and in full consultation with appropriate hospital authorities.

NAME

The name of the dental service of a hospital should be similar to that of other services of the hospital.

FUNCTIONS

A dental service of a hospital should be operated on the basis of four main functions:

Administrative • to conduct the affairs of the dental service in accordance with the established administrative procedures of the hospital.

Consultative • to act, through customary channels, in an advisory capacity on all problems related to the dental health of the patient. Included in consultations required under these standards are those required under the rules of the hospital staff. In all cases where the patient is not a good risk and in all cases in which diagnosis is obscure, or when there is doubt as to the best therapeutic measures to be utilized, consultation is appropriate. The consultation note, except in emergencies, shall be recorded prior to definitive treatment.

Clinical • to render professional services to patients in accordance with the concepts of modern scientific dentistry and to evaluate these services periodically.

Educational • to provide, where feasible, an educational program for dental interns, dental residents, dental hygienists, dental assistants and nurses; to provide training for junior staff members; to engage, when facilities permit, in the teaching of graduate and postgraduate students who are preparing themselves for the practice of one of the specialties of dentistry.

The "Requirements for the Approval of Hospital Dental Internships and Residencies" of the Council on Dental Education of the American Dental Association may be useful in establishing standards in these educational fields.

QUALIFICATIONS OF DENTISTS

All dentists privileged to practice in the hospital should be:

1. Graduates of dental schools recognized at the time of matriculation or of graduation by the Council on Dental Education of the American Dental Association and legally licensed to practice dentistry in the state in which the hospital is established.
2. Members of the American Dental Association or the National Dental Association, or eligible for membership in these associations.
3. Worthy in personal character and in professional ethics as set forth in the *Principles of Ethics of the American Dental Association*.

All dentists who are appointed to the dental staff or are granted privileges to operate in a hospital should have qualifications based on experience, training and demonstrated competence comparable to that of members of other services in the hospital.

All dentists who are admitted to practice in the hospital should qualify for membership on the hospital staff in accordance with the customary local procedures.

All dentists who engage in the practice of one of the recognized specialties in dentistry should, insofar as possible, meet the requirements established by the specialty board for such practice.

ORGANIZATION AND OPERATION

In teaching hospitals and in larger hospitals, the functional division of the medical and dental staff into more than minimal departments or services is frequently desirable. In these instances, the organization of the department of dentistry or dental department should be comparable to that of other departments of the hospital.

The dental department should be organized into sections to conform to the areas of the recognized dental specialties consistent with available facilities and the needs of the community. The section on oral surgery should be administered as a section of the department of dentistry coequal with the other specialties of surgery with full consultative and advisory relations with the department of surgery.

In smaller hospitals, and in those hospitals where the principal activity of the dental department is oral surgery, this service may be

organized as a section of the surgery department coequal with the other surgical specialties.

Chief of Dental Service • The chief of the dental service should be responsible for the dental service. He should be selected for his professional and executive ability. He should be designated by a title comparable to that of the chiefs of other services. He should have the same privileges regarding appointment to the medical board or executive committee as do the chiefs of the other services.

Staff Conferences and Meetings • The members of the dental service should attend and participate in general staff conferences. They should also hold regular departmental meetings for the thorough review and analysis of their clinical activities.

Appointments and Promotions • All appointments to the dental staff shall be made by the governing body upon recommendation of the executive committee and credentials committee which should have a dental member. The terms and procedures of the appointment as established for the medical staff shall apply to the dental staff. The number of appointments and grades in rank available to the dental service will vary with the size and type of the individual hospital. The classification of appointments according to rank should be made in accordance with the standard nomenclature and the custom of other services in the hospital.

Promotion in rank should be made on a basis consistent with that established for the other services in the hospital.

Admission and Discharge of Hospital Dental Patients • Dentists shall have the privilege of admitting and discharging patients for dental treatment.

Medical Survey of Dental Patients • An adequate medical survey by a member of the medical staff shall be required on each patient before oral surgery. Indicated consultations with the medical staff shall be required in complicated cases.

Oral Examination of Dental Patients • Dental patients should have a complete oral examination by a member of the dental staff as soon after admission as conditions permit. Dental outpatients should be afforded the same service when possible.

Availability of Hospital Beds • Hospital beds should be available to the dental service in the same manner that they are available to other services of the hospital.

Records • Careful records of all histories, diagnoses, therapeutic and operative procedures should be kept on charts in accordance with the standard procedure of the hospital. Special clinical records may be useful as an aid in clinical research.

Relation to School of Nursing • If the hospital maintains a school of nursing, it is desirable for members of the dental service to participate in the training of student nurses in the fundamental principles and practical knowledge of dental health.

Rules • The dental service should establish rules for the conduct of its program comparable to the rules established by other services and not inconsistent with the rules of the hospital. The brochure, *The Dental Service and the Dental Staff*, of the Council on Hospital Dental Service will be useful in establishing dental staff rules and regulations.

Research • Research and investigation should be encouraged, and the hospital should make every effort to provide time for the investigators and such materials and assistance as may be needed.

Library • An adequate selection of dental books and periodicals should be available in the hospital library.

Physical Equipment • The space allotted to, the equipment, instruments and supplies of, the dental service should be adequate to carry out all services in accordance with generally accepted standards of practice. The brochure, *Planning the Hospital Dental Department*, of the Council on Hospital Dental Service will be useful as a guide in establishing the extent of physical facilities necessary for the dental program.

DENTAL SERVICES FOR HOSPITAL PATIENTS

The extent of dental care provided for the hospital patient will vary with the size of the hospital, the type of hospital and the type of service rendered by the hospital. For example, in hospitals for crippled children or for those suffering from tuberculosis and mental diseases, a more comprehensive dental service is necessary.

The recommended program for hospitalized patients, and for outpatients when facilities

permit, will include an oral examination based on a complete series of dental roentgenograms. Vitality tests, transilluminations, bacteriologic, pathologic and other types of laboratory tests should be used where indicated.

More specifically, the dental service should develop programs in the following areas in accordance with local needs and facilities:

Dentistry for Children (Pedodontics) • In hospitals where children are hospitalized for an extended period of time, as in hospitals for crippled children and for those suffering from chronic diseases, a pedodontic service is highly desirable. Consultation and treatment in orthodontics should be available to all such hospital patients.

Dental Roentgenology • In all hospitals there should be good facilities for dental roentgenology. In hospitals where dental roentgenograms are taken by another service, the dental service should be available for reading and interpretation of the films. Dental roentgenograms should be made by persons specially trained in this technic under the supervision of the dental service. Technicians should be given complete instruction in safety precautions.

Oral Hygiene • In all hospitals there should be an oral hygiene program whereby practical measures of mouth cleanliness should be an item of routine nursing. The volunteer and nurses aid programs in hospitals appear to be a ready source of personnel to bring to the patient an effective program of oral hygiene.

Oral Pathology • In hospitals where it is feasible, an oral pathologist should be available to the dental service because of the specialized nature of the tissues of the oral cavity.

Oral Surgery • In all hospitals there should be adequate facilities for the provision of oral surgical diagnosis and treatment. The scope of the specialty of oral surgery shall include the diagnosis, surgical and adjunctive treatment of the diseases, injuries and defects of the human jaws and associated structures within the limits of the professional qualifications and training of the individual practitioner and within the limits of agreements made at the local level by the health team concerned with the total health care of the patient.

An adequate medical survey, including physical examination, blood count, etc., shall be made for each patient before oral surgery, and the indicated consultations shall be held in complicated cases.

Periodontics • In all hospitals, it is desirable that patients have consultation and therapy available from a dentist qualified in the field of periodontics.

Restorative Dentistry • In certain hospitals, such as those for patients suffering from tuberculosis and mental diseases, a restorative dental service is highly desirable.

AMENDMENT OF EXISTING RULES

In order to comply with these standards it may be necessary to amend the rules of the hospital in order to include the words "dentist" and "dental service" in appropriate sections and to include such additional provisions as are necessary to permit proper functioning of the dental service. When necessary, the rules of the medical board should also be amended to obtain the same objectives and to facilitate interprofessional cooperation.

National Civil Defense Conference

COUNCIL ON FEDERAL DENTAL SERVICES

The Second National Dental Civil Defense Conference was held in Los Angeles on Saturday, October 15, two days prior to the opening of the 1960 annual session of the Association. More than 150 members and guests attended the conference, which was staged under the auspices of the Council.

The principal speakers on the three and one half hour program were: Congressman Chet Holifield of Montebello, Calif., Dr. Carruth J. Wagner, director of the Division of Health Mobilization of the U. S. Public Health Service, Rear Admiral Curtiss W. Schantz, chief of the Navy Dental Corps and Captain Herbert J. Towle, head, department of audiovisual training at the Navy Dental School.

Charles H. Patton, then president-elect of the Association, after welcoming the conference participants on behalf of the officers and trustees of the Association, stated that he believed it was singularly appropriate, in these perilous times, for the American Dental Association to evidence publicly—through the medium of the conference—its dedication to the cause of maintaining a vital awareness of the contribution which each member of the dental profession may be called upon to make, in emergency circumstances, to the preservation of the health of the American people.

Admiral Schantz and Captain Towle spoke extemporaneously on the instructional technics employed by the Navy Dental Corps in the presentation of its Casualty Treatment Training Course. A number of slides and films were utilized to demonstrate the visual aid devices that can be used effectively in emergency medical care training courses by civilian dental societies.

Congressman Holifield and Dr. Wagner delivered prepared addresses and these have been digested for publication in the text of this report. The digest of Dr. Wagner's paper appears below; that of Mr. Holifield's will be published in the February issue of THE JOURNAL.

In a world where international discussion is on the level of hydrogen bombs, it is important that we focus attention on our community health services and personal survival. The only absolute protection we have against modern warfare is to prevent its occurrence. However, as long as there exists in the world a political, economic and social system that is dedicated to destroying our way of life, we must devote considerable time and resources to ensure our people a capability of surviving disaster should it occur.

The National Plan for Civil Defense and Defense Mobilization, promulgated by the President in October 1958, defines

the mission of nonmilitary defense as an integral part of the total defense of the nation. This mission includes: (1) protection of life and property by preparing for and carrying out nonmilitary functions to prevent, minimize, repair and recover from injury and damages; and (2) mobilization and management of resources and production.

Much has been done by states and their local jurisdictions towards accomplishment of the first part of this twofold, nonmilitary defense mission. The states, with encouragement, guidance and assistance from the Office of Civil and Defense Mobilization, have prepared and published comprehensive operational survival plans. Similar plans have been prepared by the separate counties and communities in most states.

It has been proved under all conditions of war and peace that people succeed best who form definite ideas of what they are going to do before they start to do it. To "get something done" in civil defense, we must have an emergency operations survival plan which sets up an organization. Available health personnel are fitted within this organization in such a way as to utilize to the maximum their particular skills. Training then must be provided to increase and extend the technical skills of assigned personnel and to teach them to operate in a coordinated manner.

PRIMARY MISSION, MAJOR PROBLEMS

The primary mission of emergency health services is to:

1. Minimize the effects of natural or man-made disaster, through such measures as mass casualty care, emergency preventative health measures and rehabilitation.

2. Maintain the noncasualty population in a state of good health.

3. Restore essential community health services.

The major problems that will make the provision of health services in case of enemy attack so difficult include: (1) the pronounced disparity that will exist between the resources that remain after attack and the requirements for these resources in casualty and noncasualty care, and (2) the radiation fallout that may interdict prompt response and rescue as well as create additional casualties. The use of biological and chemical warfare agents may pose additional problems.

It is only within the organization created by our local civil defense plan that we can "get something done." Civil defense is basically government-in-an-emergency.

To develop their capacity to perform their assigned jobs as professional health workers, dentists must assume responsibilities and provide professional services which, to some extent, vary from the usual practice of dentistry. The dentist will need training beyond that which he has received in dental school, tailored to fit the specific needs of his assigned civil defense role rather than his categorical identification as a dentist.

When members of the dental profession have been given organizational assignments at local levels, and training for specific assignments has been planned, local communities will be in a position to identify training needs that are common to each type of assignment. These common training needs can then be met by basic health mobilization training courses for dentists. These basic training courses can be included with other basic emergency training in the dental school and be given to practicing dentists through such mediums as postgraduate courses at dental schools or state courses jointly sponsored by professional societies and the state civil defense director.

In the actual situation, the civil defense team must be prepared to find that the ideal operation it had planned, rehearsed and practiced is impossible, either in part or as a whole. In spite of all unplanned-

for possibilities, the community that has a plan, and has taken the necessary steps to develop a capability of implementing the plan, will find itself well-prepared to adjust to varying conditions. Planning prepares us to make a wise alliance with circumstances.

Health mobilization planning at all levels must emphasize the most efficient management and utilization of resources in order to ensure the greatest amount of health services to the greatest number of people in the event of a civil defense disaster.

If we direct our attention to the operational survival plans of our states and communities and work within the organization they provide, we will all make significant contributions to the welfare of the country.

Revisions in Group Life Insurance Program

COUNCIL ON INSURANCE

The Council is pleased to report that continued favorable loss experience under the Association's Group Life Insurance Program has enabled the Council, with the cooperation of the Great-West Life Assurance Company, to effect the adoption of certain revisions in the program which will make it even more desirable from the standpoint of the membership. These revisions, which become effective January 1, 1961, will accomplish the following:

1. A reduction of $20 in the annual premium charged members in the two lowest age groups insured under Schedule IV ($20,000 benefit).

2. The incorporation, without an increase in rate, of a provision under which payment of premiums will be waived for any insured member who becomes permanently and totally disabled prior to his 60th birthday.

3. The incorporation on a permanent basis of the heretofore experimental practice of issuing paid-up policies for $400 to members insured under Schedule II ($5,000 benefit) and for $500 to members insured under Schedule III ($10,000 benefit) or Schedule IV ($20,000 benefit) upon attainment of age 76.

The revised schedule of premiums, as of January 1, 1961 is shown in the table.

The Council, in justifying the selective reduction in premiums to the Board of Trustees, stressed that the over-all favorable loss experience under the program had been due principally to excellent ex-

Table • Revised schedule of premiums, as of January 1, 1961

Age*	Yearly premium $20,000 insurance†	Half-yearly premium $20,000 insurance†
Up to 30	$ 40.00	$ 22.00
31 to 40	80.00	42.00
41 to 50	160.00	82.00
51 to 60	260.00	132.00
61 to 75‡	300.00	152.00

*Age nearest birthday.
†Plus $10,000 for accidental death.
‡Renewal premiums only. The age limit for acceptance of risks is 60.

perience in the two lowest age groups; that, therefore, considerations of equity would require that the members of those groups be the beneficiaries of any premium reduction. The Council is confident that the incomparably low cost at which the protection afforded under the plan now can be purchased will induce even more young members to participate, thereby assuring a continuation of the plan's fine record. The Council does not believe that any student member or young active member of the Association can afford to ignore the extraordinary life insurance bargain available to him through the program.

An insured member under age 60 who is totally disabled on January 1, 1961 may file a notice of claim under the waiver-of-premium benefit despite the fact that the disability pre-existed the effective date of the amendment of the policy. Proof that the disability has continued uninterruptedly for at least six months must be given to the company within 60 days after (1) the date notice of claim is given or (2) the end of the six month period, if the notice was given during the first six months of uninterrupted disability. Upon receipt of proper proofs, the company will waive all premiums falling due during the continuance of the disability. All notices and proofs should be sent to: Group Claims Department, The Great-West Life Assurance Company, Winnipeg, Canada.

Additions to the Library

BUREAU OF LIBRARY AND INDEXING SERVICE

The books listed here have been added recently to the Bureau collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing books, but there is a minimal charge of one dollar for each package library. Practically all the dental journals published in the world at present are available to members on loan. Lists of books and package libraries are available on request.

BOOKS

AKTUELLE BEITRÄGE ZUR ZAHNMEDIZIN; ausgewählte Vorträge aus den Fortbildungslehrgängen für Zahnärzte 1957 in Dresden und in Leipzig. (Schriftenreihe der ärztlichen Fortbildung No. 5.) Berlin, Volk und Gesundheit, 1959. 147 p. DM17.70.

AMERICAN CANCER SOCIETY. SUBCOMMITTEE OF THE STATISTICS COMMITTEE. Manual of tumor nomenclature and coding. New York, 1951. 119 p. $2.50.

AMERICAN DENTAL ASSOCIATION. BUREAU OF ECONOMIC RESEARCH AND STATISTICS. Facts about states for the dentist seeking a location. Chicago, 1960. 34 p.

AMERICAN DENTAL ASSOCIATION. COUNCIL ON DENTAL EDUCATION & AMERICAN ASSOCIATION OF DENTAL SCHOOLS. Conference on utilization and training of dental assistants, September 13-15, 1960. Chicago, 1960. 151 p.

BLACKMAN, SYDNEY. An atlas of dental and oral radiology. Bristol, Wright, 1959. 371 p. $15.

CALIFORNIA. UNIVERSITY. INSTITUTE OF INDUSTRIAL RELATIONS. Prepaid dental care conference, April 29-30, 1960, at the Statler Hilton Hotel, Los Angeles, California. Los Angeles, 1960. 57 p. Mimeo.

CHAVES, M. M. Manual de odontologia sanitária. Vol. 1: Teoria da odontologia sanitária. São Paulo, 1960. 391 p.

COMMISSION ON THE SURVEY OF DENTISTRY IN THE UNITED STATES. Dentistry in the United States; status, needs, and recommendations. Summary report. B. S. Hollinshead, Director. Washington, American Council on Education, 1960. 66 p. $1.

CUNHA, E. S. História da odontologia no Brazil, 1500-1900. 2d ed. Rio, Editora Cientifica, 1952. 288 p. $4.25.

DALDERUP, L. M. Nutrition and caries; a few observations in experimental animals. (Thesis—University of Amsterdam.) Amsterdam, 1959. 95 p.

DENTAL CLINICS OF NORTH AMERICA, November, 1960. Symposium on controversies in dentistry. Philadelphia, Saunders, 1960. 328 p.

DENVER SUMMER MEETING FOR THE ADVANCEMENT OF ORTHODONTIC PRACTICE AND RESEARCH. 22nd annual meeting, Writers' Manor, Denver, Colorado, August 2-7, 1959. Denver, 1960. 341 p. $30.

ELLIS, R. G. The classification and treatment of injuries to the teeth of children; a reference manual for the dental student and the general practitioner. 4th ed. Chicago, Year Book Publishers, 1960. 250 p. $4.50.

FAJARDO AGUILERA, CECILIA & LONDOÑO, EDUARDO. Seminario de anatomía patológica sobre afecciones clinicas e histopatológicas de la pulpa dental. Bogotá, Pontificia Universidad Católica Javeriana, 1959. 153 p.

GREWE, H. E. Dringliche Chirurgie beim Säugling und Kind. Stuttgart, Thieme, 1959. 180 p. DM25.

INTERNATIONAL OFFICE FOR DENTAL HEALTH INFORMATION. Cataloge. Zurich, 1960. 36 p.

JAMES, W. W. The jaws and teeth of primates; photographs and commentaries. London, Pitman, 1960. 328 p. $21.

MACINTOSH, R. R. & BANNISTER, F. B. Grundlagen der Allgemeinnarkose. Berlin, Volk und Gesundheit, 1960. 341 p. DM29.90.

ORTHODONTIC DIRECTORY OF THE WORLD. 20th ed. Edited by O. A. Oliver and W. H. Oliver. Nashville, Tenn., American Association of Orthodontists, 1960. 272 p.

PELTON, W. J.; BOTHWELL, RUTH & VAVRA, H. M. The dental profession in the Midwest. (U. S. Public Health Service publica-

tion No. 751.) Washington, Govt. Print. Off., 1960. 20 p. $0.15.

PELTON, W. J. & ROWAN, J. C. Digest of prepaid dental care plans, 1960. (U. S. Public Health Service publication No. 585.) Washington, U. S. Public Health Service, 1960. 103 p.

POLLOCK, M. I. The assistant's role in the dental profession. Toronto, Canadian National Refining Co., 1959. 45 p. $1.50.

PORT, THEODOR. Vademecum der Mundkrankenheiten. Munich, Pflaum, 1959. 135 p. $2.

RAMM, JACOB. Den Norske Tannlaegeforening gjennom 75 år, 1884-1959. Oslo, 1959. 355 p.

RODRIGUEZ CABRALES, SELMA; OSORIO FERNANDEZ, CECILIA & LLANOS, ENRIQUE. Las corrientes eléctricas y su aplicación en endodoncia. (Seminario para optar al título de doctores en odontología—Pontificia Universidad Católica Javeriana.) Bogotá, 1959. 49 p.

RODRIGUEZ GARAVITO, ADELA & OTHERS. Valor de la radiografía coronal en el diagnostico de las caries proximales incipientes. (Seminario para optar el título de doctores en odontología — Pontificia Universidad Católica Javeriana.) Bogotá, 1959. 93 p.

ROJAS, ARMANDO. Exámen y profilaxis en odontopediatría. (Thesis—Pontificia Universidad Católica Javeriana.) Bogotá, 1958. 64 p.

SANCHEZ, CARLOS & OTHERS. Trastornos causados por la exodoncia prematura de los dientes temporales. (Seminario de odontopediatría — Pontificia Universidad Católica Javeriana.) Bogotá, 1959. 71 p.

SCHUERMANN, HANS. Krankheiten der Mundschleimhaut und der Lippen. 2d ed. Munich, Urban & Schwarzenberg, 1958. 524 p. $22.50.

SHAPIRO, ROBERT & JANZEN, A. H. The normal skull; a roentgen study. New York, Hoeber, 1960. 257 p. $18.

SORRIN, SIDNEY, ed. The practice of periodontia. New York, McGraw-Hill, 1960. 496 p. $19.50.

SPRENG, MAX. Allergie und Zahnmedizin; eine Einführung für Zahnärzte und Studierende. (Allergie- und Asthmaforschung, Band 2.) Leipzig, Barth, 1959. 137 p. $3.25.

STOCKFISCH, HUGO. Die neuzeitliche kieferorthopädische Praxis; ein kieferorthopädisches Vademecum. 2d ed. Heidelberg, Hüthig, 1959. 456 p. DM48.

STOCKHOLMS TANDLÄKARFÖRENING. Jubileumsskrift, 1908-1958. Stockholm, 1958. 139 p.

SZTELE, ROMUALD. Herstellung kieferorthopädischer Apparate. Berlin, Volk und Gesundheit, 1960. 83 p. DM13.70.

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE. Health, education, and welfare trends. Washington, Govt. Print. Off., 1960. 90 p. $0.50.

U. S. NATIONAL HEALTH SURVEY. Loss of teeth, United States, July 1957 - June 1958; statistics on persons who have lost all their permanent teeth, by age, sex, residence, region, race, income, education, time interval since last dental visit, and volume of dental visits. Based on data collected in household interviews during July 1957 - June 1958. (*Its* Health statistics, ser. B22.) Washington, U. S. Public Health Service, 1960. 26 p. $0.25.

U. S. NAVAL DENTAL SCHOOL. Dental technician, general. (NAVPERS 10686-A.) Washington, Govt. Print. Off., 1958. 588 p. $2.25.

U. S. NAVY DENTAL CORPS. Dental officer training programs. Prepared by the Dental Division, Bureau of Medicine and Surgery, Department of the Navy and the U. S. Naval Dental School, National Naval Medical Center. Bethesda, Md., 1960. 141 p. Mimeo.

WADE, A. B. Basic periodontology. Bristol, Wright, 1960. 303 p. $10.

WHITE HOUSE CONFERENCE ON CHILDREN AND YOUTH, 1960; conference proceedings, March 27-April 2, 1960. Washington, Golden Anniversary White House Conference on Children and Youth, Inc., 1960. 429 p.

WIEGEL, PAUL. Zahnärzte und Zahnbehandlung im alten Frankfurt am Main bis zum Jahre 1810. (Beiträge zur Geschichte der Zahnheilkunde, Heft 2.) Munich, Barth. 1957. 96 p. $5.

PERIODICALS

DDA REFLECTOR. (Denver)

DENTAL PROGRESS. (Chicago)

JOURNAL OF CLINICAL STOMATOLOGY CONFERENCES. (New York)

JOURNAL OF THE INDIAN ACADEMY OF DENTISTRY. (Bombay)

INFORMATIONS, COLLEGE OF DENTAL SURGEONS OF THE PROVINCE OF QUEBEC. (Montreal)

PRÓTESIS DENTAL. (Madrid)

SOUTHERN CALIFORNIA STATE DENTAL HYGIENISTS' ASSOCIATION JOURNAL. (Los Angeles)

The 1959 survey of dental practice
VIII. Number of patients and patient visits; recall systems

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

Self-employed dentists participating in this survey were asked to indicate, if possible, the number of patients (individuals) treated during 1958. They were also asked to record the number of patient visits (sittings) and the number of new patients during this same period. The relative difficulty experienced by dentists in answering these questions is reflected in the low rate of response. Roughly 60 per cent of the respondents did not indicate the number of patients treated and approximately half did not answer the questions relating to number of patient visits and number of new patients.

The distribution of nonsalaried dentists according to number of patients treated is shown in Table 54. The outstanding characteristics of this distribution are its extremely wide spread and the tendency for each grouping of number of patients to be equally dense. Respondents tended to present the number of patients in multiples of 25 for less than 1,000 patients and in multiples of 250 for 1,000 or more patients. This clustering was absent in the distribution relating to number of patient visits (Table 55).

Some of the factors affecting the number of patients are location of practice, age of the dentist, type of practice and certain aspects of practice organization and management. However, it is apparent that these factors do not account for all of the total variation exhibited by the dis-

Table 54 • Percentage distribution of nonsalaried dentists by number of patients in 1958

Number of patients	Per cent of dentists	Cumulative per cent
– 99	1.6	1.6
100– 199	3.9	5.5
200– 299	4.2	9.7
300– 399	7.2	16.9
400– 499	6.8	23.7
500– 599	6.9	30.6
600– 699	7.8	38.4
700– 799	6.0	44.4
800– 899	5.3	49.7
900– 999	4.0	53.7
1,000–1,099	10.1	63.8
1,100–1,199	2.5	66.3
1,200–1,299	5.9	72.2
1,300–1,399	1.1	73.3
1,400–1,499	1.6	74.9
1,500–1,599	4.5	79.4
1,600–1,999	4.4	83.8
2,000–2,399	5.3	89.1
2,400–2,799	3.2	92.3
2,800–3,199	3.0	95.3
3,200–	4.7	100.0

Table 55 • Percentage distribution of nonsalaried dentists by number of patient visits during 1958

Number of patient visits	Per cent of dentists	Cumulative per cent
– 499	2.2	2.2
500– 999	3.1	5.3
1,000–1,499	5.4	10.7
1,500–1,999	10.7	21.4
2,000–2,499	15.6	37.0
2,500–2,999	13.7	50.7
3,000–3,499	14.0	64.7
3,500–3,999	11.4	76.1
4,000–4,499	7.1	83.2
4,500–4,999	5.8	89.0
5,000–5,499	4.0	93.0
5,500–5,999	1.4	94.4
6,000–6,499	2.1	96.5
6,500–6,999	.9	97.4
7,000–	2.6	100.0

Table 56 • Average number of patients and patient visits of nonsalaried dentists in 1958, by region

Region	Average no. of patients		Average no. of patient visits	
	Mean	Median	Mean	Median
New England	1,061	798	3,300	3,300
Middle East	1,047	700	3,147	2,998
Southeast	1,448	1,070	3,356	3,014
Southwest	1,353	1,001	2,744	2,607
Central	1,123	853	2,926	2,646
Northwest	1,471	1,001	3,158	2,718
Far West	1,227	899	3,371	2,750
United States	1,184	900	3,130	2,899

tribution shown in Table 54. A considerable amount of the residual variation appears to be due to an error factor. A clue to the nature of the error factor is supplied by the tendency to answer in multiples of 25 or 250, which indicates that the answers supplied are approximations and are not based on accurate accounting. For this reason, and because of the relatively high nonresponse, statistics on number of patients are regarded as being less reliable than most statistics presented in this survey.

The distribution of nonsalaried dentists according to number of patient visits tends to show a response error considerably less than for number of patients (Table 55). A dentist can readily refer to his appointment book and actually count the number of appointments for the year, or count the number of appointments during a typical week and multiply that number by the total number of weeks worked during the year.

The mean number of patients reported by nonsalaried dentists was 1,184 and the median 900. Roughly 25 per cent had 500 or less patients and another 25 per cent had 1,500 or more patients. Owing to this wide variation, it is difficult to typify a dentist according to number of patients. The mean of 1,184 patients represents an increase of 27 per cent over the mean in 1949, 17 per cent over 1952 and 12 per cent over 1955.

The mean number of patient visits during 1958 was 3,130 and the median was 2,899. Accordingly, the mean number of visits per patient during 1958 was 2.6. This compares with 2.8 visits per patient during 1952 and 1955.

Based on the mean of 1,184 patients per nonsalaried dentist, it is estimated that 81,000,000 people, or 47 per cent of the civilian population, saw the dentist during 1958.

LOCATION

Table 56 presents the average number of patients and patient visits by region. As one would expect, regions with a relatively high ratio of population to dentists also had a relatively high average number of patients per dentist.

It is interesting to note the inverse relationship between the number of patients and the average number of visits per patient. There is a strong tendency for regions with a smaller number of patients per dentist to have a higher average number of visits per patient. New England reported the highest average number of visits per patient with 3.1, followed by 3.0 in the Middle East, 2.7 in the Far West, 2.6 in the Central region, 2.3 in the Southeast, 2.1 in the Northwest and 2.0 in the Southwest.

There are several possible reasons for variation in number of visits per patient.

Table 57 • Average number of patients and patient visits of nonsalaried dentists in 1958, by size of city and for four large cities

City size or city	Average no. of patients		Average no. of patient visits	
	Mean	Median	Mean	Median
Under 1,000	1,047	700	2,645	2,035
1,000–2,500	1,281	1,004	2,838	2,800
2,500–5,000	1,260	1,005	2,819	2,833
5,000–10,000	1,262	1,001	3,441	2,950
10,000–25,000	1,343	998	3,227	3,032
25,000–50,000	1,354	901	3,017	2,800
50,000–100,000	1,219	999	3,243	3,018
100,000–250,000	991	801	3,219	3,020
250,000–500,000	1,134	970	3,248	2,958
500,000–1,000,000	1,173	759	2,805	2,525
Over 1,000,000	937	597	3,236	2,960
All city sizes	1,184	900	3,130	2,899
New York	690	501	3,116	3,022
Chicago	636	600	2,900	2,488
Los Angeles	1,794	650	4,370	2,655
Philadelphia	1,292	700	3,037	2,988

Table 58 • Average number of patients and patient visits of nonsalaried dentists in 1958, by age of dentist

Age of dentist	Average no. of patients		Average no. of patient visits	
	Mean	Median	Mean	Median
–29	492	303	1,517	1,560
30–39	1,284	941	3,380	3,004
40–49	1,196	905	3,323	3,000
50–59	1,178	996	3,031	2,610
60–69	938	797	2,293	1,803
70–	*	*	*	*
All ages	1,184	900	3,130	2,899

*Too few replies for reliable statistics.

The average need for dental care may be less in some areas than in others. More people may receive complete care in some regions than in others. Variation in length of appointment may be a large factor in the variation in number of visits per patient.

The average number of patients and patient visits by city size, and for four large cities, is shown in Table 57. Among places with a population of less than 1,000 or more than 100,000, the mean number of patients was below the national mean of 1,184.

Table 59 • Average number of patients and patient visits of nonsalaried dentists in 1958, by type of practice

Type of practice	Average no. of patients		Average no. of patient visits	
	Mean	Median	Mean	Median
General practitioner	1,191	900	3,082	2,858
Specialist	1,053	515	3,757	3,675
Oral surgeon	2,507	2,500	3,844	3,500
Orthodontist	323	200	4,336	4,750
Pedodontist	1,263	1,013	4,044	3,609
Other specialists	1,137	800	2,601	2,550
All types of practice	1,184	900	3,130	2,899

Table 60 • Average number of patients and patient visits of nonsalaried dentists in 1958 according to type of practice or organization

Type of practice organization	Average no. of patients		Average no. of patient visits	
	Mean	Median	Mean	Median
Nonsalaried practice without partners and with no sharing of costs	1,157	900	3,117	2,880
Nonsalaried practice without partners, but sharing costs of offices or assistants, etc.	1,228	863	3,057	2,700
Nonsalaried practice as a partner in a complete partnership	1,954	1,400	4,538	3,500

The mean number of patients for the two largest cities, New York and Chicago, was much lower than the national mean. The mean number of visits per patient was also the largest for these two cities with 4.5 and 4.6 visits per patient respectively. The mean number of patients for Los Angeles and Philadelphia was much larger than the median, indicating that a few dentists from these cities reported an unusually large number of patients.

AGE; TYPE OF PRACTICE

The number of patients and patient visits vary considerably according to the age of the dentist (Table 58). Dentists under 30 averaged only 492 patients and 1,517 patient visits. The highest average number of patients (1,284) and patient visits (3,380) was reached by dentists in their 30's. The decline was relatively small for dentists in their 40's and 50's but substantial for dentists in their 60's.

The peak in both number of patients and income was reached by younger dentists in the current survey than in the 1956 survey.

The average number of visits per patient was highest among dentists under 30 (3.1 visits per patient), was about equal to the over-all average of 2.6 for dentists 30 through 59, and was lowest for dentists in their 60's.

Type of practice accounts for some of the total variation in number of patients shown in Table 54. Table 59 shows the extreme variability in the number of patients according to type of practice with the oral surgeons having a mean of 2,507 patients and orthodontists with a mean of 323 patients. The average number of visits per patient varied from 13.4 for orthodontists to 1.5 for oral surgeons. Specialists as a group had 3.6 visits per patient; general practitioners had 2.6.

PRACTICE ORGANIZATION AND MANAGEMENT

There is surprising amount of variation in the number of patients and patient

Table 61 • Mean number of patients and patient visits of nonsalaried dentists by number of employees, 1958

Number of employees		Mean no. of patients	Mean no. of patient visits
Full time†	Part time†		
0	0	742	2,272
0	1	710	2,376
0	2	1,095	2,742
1	0	1,166	3,014
1	1	1,242	3,182
1	2	1,404	3,237
2	0	1,530	3,174
2	1	1,607	4,005
3	0	1,931	3,929
4 or more	0	*	*

*Too few replies for reliable statistics.

†"Full time" means full-time positions occupied all year, and "part time" means either part-time positions or positions filled only part of the year.

Table 62 • Mean number of patients and patient visits of nonsalaried dentists in 1958 according to number of dental chairs

Number of chairs	Mean no. of patients	Mean no. of patient visits
1	781	2,440
2	1,193	3,201
3	1,532	3,643
4	2,118	4,975
5 or more	*	*
All nonsalaried dentists	1,184	3,130

*Too few replies for reliable statistics.

Table 63 • Mean number of patients and patient visits of nonsalaried dentists in 1958 by number of dental units used

Number of units	Mean no. of patients	Mean no. of patient visits
1	848	2,479
2	1,207	3,223
3	1,471	3,755
4 or more	3,059	5,581
All nonsalaried dentists	1,184	3,130

visits according to the way practice is organized (Table 60). Dentists in complete partnership reported a mean number of patients of 1,954 per dentist, 68.9 per cent more than dentists with solo practice with no sharing of costs, and 59.1 per cent more than dentists in solo practice who shared costs. The ratio of number of patient visits to number of patients, however, was the lowest for dentists in complete partnership, with 2.3 visits per patient. This compares with 2.7 visits per patient reported by dentists in solo practice with no sharing of costs and 2.5 visits per patient by dentists in solo practice who shared costs.

Table 61 shows the mean number of patients according to number of employees without regard to type of employee or number of chairs and units. The mean number of patients increased from 742 for dentists with no employees to 1,166 for dentists with one full-time employee, 1,530 for dentists with two and 1,931 for dentists with three full-time employees.

Although the number of patients and patient visits increases with number of chairs and units (Tables 62 and 63), the ratio of number of patient visits to number of patients decreases from 3.1 for one-chair offices to 2.7 for two-chair offices, 2.4 for three-chair offices and 2.3 for four-chair offices. A similar trend in the average visits per patient prevails according to number of units.

The average number of patients and patient visits according to average wait for an appointment has an interesting pattern (Table 64). The mean number of patients increases steadily from 761 for one or two days of waiting and reaches a

Table 64 • Average number of patients and patient visits of nonsalaried dentists according to average wait for an appointment in 1958

Average wait	Average no. of patients		Average no. of patient visits	
	Mean	Median	Mean	Median
One or two days	761	497	2,318	2,000
Three to six days	1,180	708	2,841	2,500
One week	1,028	802	3,119	2,880
Two weeks	1,351	1,000	3,449	3,000
Three weeks	1,470	1,050	3,729	3,490
Four weeks	1,477	1,200	3,655	3,475
Five weeks	1,591	1,485	3,209	2,818
Six weeks or more	1,420	1,013	3,767	3,600
All nonsalaried dentists	1,184	900	3,130	2,899

Table 65 • Average number of patients and patient visits of nonsalaried dentists in 1958, according to description of practice

Description of practice	Average no. of patients		Average no. of patient visits	
	Mean	Median	Mean	Median
Because of the length of your appointment list, some persons who contacted you for dental care actually obtained this care from another dentist	1,476	1,104	3,541	3,390
You provided dental care for all who requested appointments, but you felt more rushed and worked more hours than you would have liked (you felt "overworked").	1,467	999	3,834	3,500
You provided dental care for all who requested appointments, and did not feel "overworked."	1,056	801	2,921	2,600
You did not have as many patients as you would have liked. How many more patients would you have liked?	659	497	2,027	1,900
All nonsalaried dentists	1,184	900	3,130	2,899

peak of 1,591 patients at five week waiting period. It then drops to 1,420 patients at waiting period of six weeks or longer. The mean number of patient visits, on the other hand, rises from 2,318 for one or two days of waiting and reaches its maximum of 3,729 at three weeks average wait. It then gradually declines to 3,209 at five weeks and takes a sudden jump to 3,767 for dentists with average wait of six weeks or longer. The medians display a corresponding pattern. Both average wait for an appointment and average number of patients vary greatly by type of practice, which may somehow account for this unusual pattern.

Dentists were asked to check one of four statements describing varying degrees of busyness during the year 1958. Those dentists who were unable to care for all patients seeking treatment, and those dentists who felt overworked in

Table 66 • Average number of patients and patient visits of nonsalaried dentists in 1958 according to speed normally used in operating a handpiece

Speed	Average no. of patients		Average no. of patient visits	
	Mean	Median	Mean	Median
Low	1,032	875	2,535	2,300
Intermediate	1,040	825	2,908	2,650
High	1,263	1,027	3,156	2,880
Super	1,261	1,001	3,407	3,000
Low and intermediate	835	650	2,751	2,650
Low and high	*	*	*	*
Low and super	1,100	990	2,894	2,552
Intermediate and high	*	*	*	*
Intermediate and super	1,329	850	2,945	2,900
High and super	1,233	900	2,936	3,000
All speeds	1,184	900	3,130	2,899

Definitions: Low speed—under 10,000 rpm. Intermediate speed—10,000 rpm to 29,999 rpm. High speed—30,000 rpm to 99,999 rpm. Super speed—100,000 rpm and over.
*Too few replies for reliable statistics.

Table 67 • Average number of new patients of nonsalaried dentists in 1958, by region

Region	Mean	Median
New England	212	146
Middle East	232	123
Southeast	373	251
Southwest	509	299
Central	261	155
Northwest	260	220
Far West	266	198
United States	278	175

Table 68 • Average number of new patients of nonsalaried dentists in 1958, by age of dentist

Age of dentist	Mean	Median
–29	364	300
30–39	340	173
40–49	279	175
50–59	184	100
60–69	112	60
70–	*	*
All ages	278	175

*Too few replies for reliable statistics.

Table 69 • Mean number of new patients according to type of practice

Type of practice	Mean no. of new patients
General practitioner	253
Specialist	461
Oral surgeon	1,729
Orthodontist	109
Pedodontist	393
Other specialists	316

Table 70 • Percentage of nonsalaried dentists with a recall system, by age of dentist

Age of dentist	Per cent
–29	96.6
30–39	92.0
40–49	84.1
50–59	77.2
60–69	68.8
70–	47.1
All ages	84.0

doing so, averaged about 1,470 patients, compared to 1,184 for all nonsalaried dentists (Table 65). Dentists who cared for all would-be patients and did not feel overworked averaged 1,056 patients, and dentists who said they did not have enough patients averaged 659 patients.

Dentists who used low and intermediate speed handpieces exclusively averaged about 1,035 patients (Table 66). Those who used high and super speed handpieces averaged 1,262 patients. Highest average number of patients (1,329) was recorded by dentists using a combination of super and intermediate equipment.

Table 71 • Percentage of nonsalaried dentists with a recall system, by size of city and for six large cities

City size	Per cent
Under 1,000	75.5
1,000–2,500	74.3
2,500–5,000	81.7
5,000–10,000	86.3
10,000–25,000	87.3
25,000–50,000	84.6
50,000–100,000	85.8
100,000–250,000	88.3
250,000–500,000	82.4
500,000–1,000,000	82.2
Over 1,000,000	82.6
All city sizes	84.0
New York	84.1
Chicago	72.5
Los Angeles	80.6
Philadelphia	88.0
Detroit	89.5
Cleveland	86.2

Table 72 • Percentage of nonsalaried dentists with a recall system who included patients with two complete dentures, by age of dentist

Age of dentist	Per cent
–29	42.0
30–39	28.3
40–49	24.5
50–59	22.4
60–69	26.3
70–	34.4
All ages	26.8

Table 73 • Percentage of nonsalaried dentists having a recall system and including patients with two complete dentures who provided specified types of service, by age of dentists

Type of service	Age						
	-29	30-39	40-49	50-59	60-69	70-	All ages
Cleaning and polishing dentures	74.5	74.7	84.7	77.6	68.6	*	77.1
Occlusal equilibration	51.1	67.8	76.7	87.8	84.3	*	73.0
Check for fit and adjustment	25.5	36.5	27.0	29.6	35.3	*	31.9
Oral examination	17.0	18.7	12.9	16.3	17.6	*	16.5
Not elsewhere classified	.0	1.0	1.8	7.1	17.6	*	4.4

*Too few replies for reliable statistics.

NEW PATIENTS IN 1958

To the question "Approximately how many new patients did you have in 1958?" the mean reply was 278 and the median was 175 (Table 67). The mean reported by dentists in the Southwest (509) was far higher than in any other region. By age, young dentists, of course, reported the greatest number of new patients (Table 68). In fact, 75 per cent of all 1958 patients reported by dentists under 30 were new patients.

Two groups of specialists deviated markedly from the average in number of new patients. Oral surgeons reported a mean of 1,729 new patients in 1958 and orthodontists a mean of 109 new patients (Table 69).

THE RECALL SYSTEM

Nonsalaried dentists participating in the survey were asked if they had a recall system to remind patients when it is time to come to the office. Eighty-four per cent of the respondents indicated they had a recall system. The mean number of patients reported by dentists with a recall system was 1,171 which compares with the mean of 1,264 for dentists without recall system. The mean number of patient visits of dentists with a recall system was 3,185, or 510 visits greater than for dentists without recall system.

The percentages of nonsalaried dentists having a recall system according to age of dentist and by city size and for six large cities are shown in Table 70 and Table 71, respectively.

Older dentists and dentists in small towns were below average in use of recall systems. The participating dentists were asked if their recall system included patients for whom two complete dentures had been provided. About one fourth of dentists with recall systems included patients with two complete dentures (Table 72).

Dentists who included patients with two complete dentures in their recall system were asked to indicate the type of service(s) provided. Table 73 shows the type of services provided according to the age of dentist. It should be noted that the relatively low percentages for "check for fit and adjustment" and "oral examination" may result from the fact that these were "write-in" replies whereas others were "check-off" replies.

Dentists were also asked if they accepted patients of all ages and if not, which age group(s) they excluded. A large majority of nonsalaried dentists, 89.4 per cent, stated they accepted patients of all ages. A total of 4.8 per cent excluded children and 1.5 per cent excluded adults. A large proportion of dentists who excluded adults were specialists.

The next article in this series will present information on "dentist busyness" as perceived by the dentist himself, and on length of wait for an appointment.

Survey of hospital dental departments

I. Introduction

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

Between 1948 and 1958 the number of hospitals with dental departments increased from 1,806 to 2,352. During this period, there was, of course, an increase in the total number of hospitals, and the increase in the percentage of hospitals having dental departments was moderate: from 29.3 per cent in 1948 to 34.5 per cent in 1958.[1]

With an average increase of over 50 hospital dental departments per year, and with growing realization that a hospital without a dental department is not providing a complete health service, it was decided late in 1959 to conduct a survey of hospital dental departments. The purpose of the survey was to obtain statistical information on the scope and characteristics of hospital dental service. Results of the survey should provide new insight into the problems of hospital dental departments and provide direction for improvements and further study. The information obtained in the survey will be particularly useful in the programs of the Council on Hospital Dental Service and the Council on Dental Education.

Questionnaires were sent to the chiefs of the dental service of 2,352 hospitals listed by the American Hospital Association as having dental departments. Completed questionnaires were received from 1,004 hospitals with dental departments, a return of 42.7 per cent (Table 1).

The results of the survey will be more meaningful if considered in the light of statistics on the prevalence of dental departments in the various types of hospitals. Although 34.5 per cent of all hospitals had dental departments in 1958, this figure varied greatly according to ownership or control of the hospital and other factors. Of all federal hospitals, 96.9 per cent had dental departments, compared to 56.0 per cent of all hospitals owned by state and local governments, 23.4 per cent of voluntary (nonprofit) hospitals and only 10.8 per cent of proprietary hospitals. In psychiatric hospitals, the percentage with dental departments was 100 per cent for those operated by the federal government, 94.4 per cent for those operated by state and local governments, 28.8 per cent for voluntary psychiatric hospitals and 12.2 per cent for proprietary psychiatric hospitals.

There are large regional differences in the percentage of hospitals having dental departments (Table 1). Where 57.5 per cent of the hospitals in the Middle East, and 51.3 per cent in New England, had dental departments, the percentages in the other five regions were much lower, ranging from 22.3 per cent in the Northwest to 32.6 per cent in the Central region. It has been shown that the percentage of hospitals having dental departments varies substantially with ownership or control of the hospital and with size of the hospital. These factors may account for some, but certainly not all, of the regional variation.

The large majority of hospitals are "short-term" hospitals (average stay less than 30 days). Among the short-term nonfederal hospitals, dental departments

Table 1 • Distribution of hospitals with dental departments and of hospitals responding in the survey, by region and state

	Hospitals with dental departments		Hospitals responding in survey	
	Number	Per cent	Number	Per cent
New England	221	51.3	99	44.8
Connecticut	47	66.2	19	40.4
Maine	17	28.8	8	47.1
Massachusetts	119	57.2	52	43.7
New Hampshire	11	28.9	7	63.6
Rhode Island	16	69.6	8	50.0
Vermont	11	34.4	5	45.5
Middle East	678	57.5	270	39.8
Delaware	11	68.8	5	45.5
District of Columbia	15	65.2	11	73.3
Maryland	48	60.0	19	40.0
New Jersey	105	69.1	38	36.2
New York	255	52.6	98	38.4
Pennsylvania	220	65.9	87	39.5
West Virginia	24	26.7	12	50.0
Southeast	369	26.3	144	39.0
Alabama	28	21.9	9	32.1
Arkansas	20	24.1	5	25.0
Florida	41	25.9	20	48.8
Georgia	39	27.7	17	43.6
Kentucky	40	30.3	21	52.5
Louisiana	43	32.1	18	41.9
Mississippi	15	14.3	5	33.3
North Carolina	37	21.3	12	32.4
South Carolina	16	20.8	5	31.3
Tennessee	44	29.3	14	31.8
Virginia	46	38.3	18	39.1
Southwest	193	24.2	95	49.2
Arizona	23	32.9	14	60.9
New Mexico	19	37.3	12	63.2
Oklahoma	34	26.6	19	55.9
Texas	117	21.3	50	42.7
Central	531	32.6	215	40.5
Illinois	112	34.5	46	41.1
Indiana	42	30.7	26	61.9
Iowa	24	19.4	10	41.7
Michigan	82	33.1	31	37.8
Minnesota	45	22.1	19	42.2
Missouri	48	33.8	19	39.6
Ohio	103	40.7	41	39.8
Wisconsin	75	38.7	23	30.7
Northwest	149	22.3	63	42.3
Colorado	24	25.0	8	33.3
Idaho	6	12.0	2	33.3
Kansas	33	21.6	14	42.4
Montana	16	26.2	7	43.8
Nebraska	26	23.4	10	38.5
North Dakota	8	12.7	5	62.5
South Dakota	19	28.8	11	57.9
Utah	10	27.8	4	40.0
Wyoming	7	22.6	2	28.6
Far West	211	29.6	118	55.9
Alaska	10	41.7	3	30.0
California	134	31.4	78	58.2
Hawaii	14	43.8	6	42.9
Nevada	5	27.8	4	80.0
Oregon	14	17.7	6	42.9
Washington	34	25.8	21	61.8
United States	2,352	34.5	1,004	42.7

Table 2 • Percentage distribution of responding hospitals according to ownership or control, by region

Region	Ownership or control				All hospitals
	Governmental, nonfederal	Governmental, federal	Voluntary (nonprofit)	Proprietary	
New England	33.3	17.2	48.5	1.0	100.0
Middle East	31.5	14.1	51.1	3.3	100.0
Southeast	34.7	44.4	18.8	2.1	100.0
Southwest	22.1	53.7	17.9	6.3	100.0
Central	42.3	16.7	37.7	3.3	100.0
Northwest	23.8	58.7	17.5	.0	100.0
Far West	47.5	35.6	15.2	1.7	100.0
United States	34.9	28.4	33.9	2.8	100.0

Table 3 • Percentage distribution of responding hospitals according to type of hospital, by ownership or control

Type of hospital	Ownership or control				All hospitals
	Governmental, nonfederal	Governmental, federal	Voluntary (nonprofit)	Proprietary	
General	28.8	81.4	83.2	78.5	63.5
Psychiatric	38.8	9.5	1.8	14.3	17.2
Tuberculosis	17.4	5.6	.9	.0	8.0
Children's	.0	.0	3.8	.0	1.3
Orthopedic	1.1	.0	3.2	3.6	1.6
Chronic disease	3.1	.4	3.8	.0	2.5
Other specialty	2.3	.0	2.4	.0	1.6
Hospital department of an institution	8.5	3.1	.9	3.6	4.3
Total	100.0	100.0	100.0	100.0	100.0

Table 4 • Percentage distribution of responding hospitals according to number of beds, by type of hospital

Type of hospital	Number of beds							All hospitals
	–24	25–49	50–99	100–199	200–299	300–499	500–	
General	.5	7.8	15.8	15.5	17.9	20.9	21.6	100.0
Psychiatric	.0	1.2	4.6	5.2	2.9	2.3	83.8	100.0
Tuberculosis	.0	1.2	16.3	25.0	16.3	21.2	20.0	100.0
Children's	.0	7.7	7.7	46.1	23.1	15.4	.0	100.0
Orthopedic	.0	12.5	50.0	25.0	12.5	.0	.0	100.0
Chronic disease	.0	8.0	12.0	20.0	20.0	12.0	28.0	100.0
Other specialty	7.7	15.4	23.1	30.7	7.7	7.7	7.7	100.0
Hospital department of an institution	14.0	27.9	27.9	16.3	2.3	2.3	9.3	100.0
Per cent	1.0	7.2	14.8	15.6	14.4	16.0	31.0	100.0

existed in 25.9 per cent of the voluntary hospitals, 24.4 per cent of state and local governmental hospitals and 10.1 per cent of proprietary hospitals.

Dental departments existed in many more of the larger than of the smaller hospitals. Among voluntary, short-term hospitals, for example, the percentage with dental departments varied from 6.2 per cent of those with less than 25 beds and 8.4 per cent of those with 25 to 49 beds, to 61.4 per cent of hospitals with 300 to 499 beds and 83.9 per cent of hospitals with 500 and more beds.

Of all hospitals listed, 51.7 per cent (3,508) were voluntary, 26.6 per cent (1,805) were nonfederal-governmental, 15.2 per cent (1,034) were proprietary and 6.5 per cent (439) were federal.

There was not much regional variation in percentage of hospitals with dental departments responding in the survey (Table 1). The greatest deviation from the national response of 42.7 per cent was the Far West's response of 55.9 per cent.

Certain types of hospitals responded better than others in the survey. Whereas only 34.9 per cent of the returns were from state and local governmental hospitals, 42.5 per cent of all hospitals with dental departments fell in this category. Comparable figures for federal hospitals were 28.4 per cent of the returns compared to 18.0 per cent of the mailing; voluntary hospitals, 33.9 per cent and 35.1 per cent, and proprietary hospitals, 2.8 per cent and 4.4 per cent.

For each of the four classifications of hospitals with respect to ownership or control, the percentage of hospitals participating in the survey varied a great deal according to region (Table 2). Federal hospitals accounted for 58.7 per cent of the returns from the Northwest and 53.7 per cent from the Southwest, compared to only 14.1 per cent from the Middle East and 16.7 per cent from the Central region. Voluntary hospitals constituted only 15.2 per cent of the returns from the Far West, compared to 51.1 per cent from the Middle East. State and local governmental hospitals represented 47.5 per cent of the returns from the Far West and 22.1 per cent from the Southwest. Although 6.3 per cent of the returns from the Southwest were from proprietary hospitals, no returns were received from proprietary hospitals in the Northwest.

About four out of five federal, voluntary and proprietary hospitals responding were general hospitals, compared to only 28.8 per cent of state and local governmental hospitals (Table 3). Among the nonfederal governmental hospitals, 38.8 per cent were psychiatric hospitals, a far greater percentage than for any other ownership classification. The percentage of tuberculosis hospitals, too, was larger among the nonfederal governmental hospitals (17.4 per cent) than among the other ownership classifications. Of all hospitals responding, nearly two thirds were general hospitals.

Of all hospitals responding in the survey, 31.0 per cent had 500 or more beds, 30.4 per cent had between 200 and 500 beds and 38.6 had fewer than 200 beds (Table 4). Of the psychiatric hospitals, however, 83.8 per cent had 500 or more beds. General hospitals varied widely in size, 21.6 per cent having 500 or more beds and 8.3 per cent having less than 50 beds.

The next chapter in this series will present information on the staffing and other characteristics of hospital dental departments.

1. Statistics on number of hospitals and number having dental departments are from the annual "Guide Issue" of Hospitals, Journal of the American Hospital Association.

Survey of public attitudes regarding dentures
II. Knowledge of the technician's role

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

The 6,861 adults participating in the survey were asked "How many months or years of training beyond high school do you think most dentists have?" Elsewhere on the questionnaire the same question was asked with respect to dental laboratory technicians. Most people underestimated the amount of training received by dentists, and overestimated the training of dental technicians. The average number of years of post-high school training as estimated by respondents was 4.5 for dentists and 2.6 for technicians (Tables 5 and 6). On the average, then, people underestimated the training of dentists by about 2.5 years, and overestimated the training of technicians by at least two years. (Most dental technicians have had less than a year of formal instruction in the craft.)

In estimating the number of years of training beyond high school for the dentist, respondents from New England and the Middle East came closest to the true figure (Table 5). The average for each of these regions was 4.7 years, compared to the other extreme of 3.9 years for the Southeast region. The best estimates of the amount of education for the dental technician were also received from New England and the Middle East. However, regional variation in both of these estimates was relatively small.

The educational level of the respondent was reflected in his knowledge of the amount of training received by dentists and technicians (Table 6). Respondents with no formal schooling es-

Table 5 • Mean years of training beyond high school for dentists and dental laboratory technicians as estimated by survey respondents, by region

Region	Estimated years of training	
	Dentists	Dental technicians
New England	4.7	2.3
Middle East	4.7	2.5
Southeast	3.9	2.6
Southwest	4.3	2.7
Central	4.5	2.7
Northwest	4.5	2.9
Far West	4.6	2.7
United States	4.5	2.6

Table 6 • Mean years of training beyond high school for dentists and dental laboratory technicians as estimated by survey respondents, by educational level of survey respondents

Educational level of respondent	Estimated years of training	
	Dentists	Dental technicians
No formal schooling	4.4	3.8
Some or all of elementary school	4.1	3.0
Some or all of high school	4.5	2.6
Some or all of college	5.2	2.2
All respondents	4.5	2.6

Table 7 • Percentage distributions of respondents according to replies to the questions "How many months or years of training beyond high school do you think most dentists have?" and "How many months or years of training beyond high school do you think most dental laboratory technicians have?"

Estimated length of training	Dentists	Dental technicians
One year or less	.9	10.5
Over 1 year to 2 years	5.7	27.7
Over 2 years to 3 years	5.9	7.8
Over 3 years to 4 years	30.2	21.2
Over 4 years to 5 years	9.1	2.9
Over 5 years to 6 years	23.6	4.7
Over 6 years to 7 years	6.5	.7
Over 7 years to 8 years	7.8	1.4
Over 8 years to 10 years	1.1	.4
Over 10 years	.2	.1
Miscellaneous	5.2	13.3
No answer	3.8	9.3
Total	100.0	100.0

timated that technicians had 3.8 years of training beyond high school, almost as high a figure as their estimate for dentists (4.4 years). Even respondents who had gone to college underestimated the training of dentists (5.2 years) and overestimated that of technicians (2.2 years).

The widespread misconception of the amount of training received by dentists and technicians is well illustrated in Table 7. The most common amount of college training attributed to the dentist was four years. Evidently many people are not aware of predental college requirements. The comparable figure for technicians was two years, with four years also mentioned frequently. It is difficult to understand why people think most technicians have two or four years of college or trade school training.

About one in every five respondents checked "yes" in reply to the question "Do you know anything about the kind of work that is performed by a dental laboratory technician?" (Tables 8, 9 and 10). Regionally, the percentage of affirmative replies varied from 12.3 per cent in the Southwest to 25.6 per cent in the Far West. In general, knowledge of the technician's work was considerably lower in the southern and central states than in either the eastern or western states.

There was a high degree of correlation between family income of the respondent and knowledge of the work of the dental technician (Table 9). Only 3.6 per cent of those with income under $1,000, and 5.9 per cent of those with income between $1,000 and $2,000, claimed knowledge of the work of the technician, compared to 26.0 per cent of the people with income between

Table 8 • Percentage distribution of respondents according to replies to the question "Do you know anything about the kind of work that is performed by a dental laboratory technician?" by region

Region	Response			Total
	Yes	No	No answer	
New England	23.2	76.0	.8	100.0
Middle East	22.3	76.3	1.4	100.0
Southeast	14.2	84.3	1.5	100.0
Southwest	12.3	86.3	1.4	100.0
Central	16.8	81.7	1.5	100.0
Northwest	16.4	82.5	1.1	100.0
Far West	25.6	73.4	1.0	100.0
United States	19.4	79.3	1.3	100.0

Table 9 • Percentage distribution of respondents according to replies to the question "Do you know anything about the kind of work that is performed by a dental laboratory technician?" by family income

Family Income	Response			Total
	Yes	No	No answer	
Under $1,000	3.6	93.5	2.9	100.0
$1,000–$1,999	5.9	92.0	2.1	100.0
$2,000–$2,999	11.6	86.5	1.9	100.0
$3,000–$3,999	13.3	84.5	2.2	100.0
$4,000–$4,999	18.4	80.5	1.1	100.0
$5,000–$5,999	20.3	78.5	1.2	100.0
$6,000–$6,999	26.0	73.5	.5	100.0
$7,000–$9,999	26.0	73.3	.7	100.0
$10,000 and over	31.6	67.4	1.0	100.0
All respondents	19.4	79.3	1.3	100.0

Table 10 • Percentage distribution of respondents according to replies to the question "Do you know anything about the kind of work that is performed by a dental laboratory technician?" by educational level of respondents

Educational level	Response			Total
	Yes	No	No answer	
No formal schooling	13.5	75.7	10.8	100.0
Some or all of elementary school	8.0	89.9	2.1	100.0
Some or all of high school	18.9	80.1	1.0	100.0
Some or all of college	34.1	65.2	.7	100.0
All respondents	19.4	79.3	1.3	100.0

$7,000 and $10,000 and 31.6 per cent of those earning $10,000 and more. Among respondents who had gone to college, 34.1 per cent indicated they were familiar with the work of the dental technician, compared to 13.5 per cent of those with no formal schooling and only 8.0 per cent of those who had gone to elementary school only (Table 10).

Those respondents who indicated they had knowledge of the work performed by dental laboratory technicians were asked to describe what they knew about the technician's work. Tables 11 and 12 show the percentage of respondents giving the various descriptions of the technician's work, according to family income and educational level of the respondent. Of the 18.9 per cent who entered a description of the technician's work, only a few answered incorrectly. However, the majority wrote that the technician made false teeth, dentures and bridges, without indicating that this work was done for, and at the direction of, the dentist.

Only 11.6 per cent checked "yes" in

Table 11 • Percentage of respondents giving specified descriptions of work performed by dental laboratory technicians, by family income

Description	Family income									All respondents
	Under $1,000	$1,000–$1,999	$2,000–$2,999	$3,000–$3,999	$4,000–$4,999	$5,000–$5,999	$6,000–$6,999	$7,000–$10,000	$10,000 and over	
Makes false teeth, dentures or bridges	1.4	2.3	6.1	7.7	11.0	11.9	16.8	14.5	18.6	11.3
Makes false teeth, dentures or bridges for dentists	.7	1.7	2.1	2.9	4.9	5.5	5.9	7.1	8.1	4.9
Repairs false teeth, dentures or bridges	.7	.6	2.3	2.1	1.5	2.4	3.0	2.1	2.4	2.1
Repairs false teeth, dentures or bridges for dentists	.0	.2	.6	.1	.3	.3	.1	.7	.5	.4
Works with x-rays	.7	1.5	1.5	1.4	1.8	1.2	2.0	1.3	2.1	1.5
Takes impressions	.7	.0	.7	.7	.6	.5	.3	.8	1.1	.6
Other nontechnician dental activities	.7	.8	.8	.6	1.2	1.7	1.1	1.9	2.4	1.3
Not elsewhere classified	.0	.8	.9	1.1	1.2	1.2	1.7	2.3	2.3	1.4
No answer	96.4	94.3	89.0	87.5	82.2	80.1	74.3	74.5	69.5	81.1

Table 12 • Percentage of respondents giving specified descriptions of work performed by dental laboratory technicians, by educational level of respondent

Description	Educational level				All respondents
	No formal schooling	Some or all of elementary school	Some or all of high school	Some or all of college	
Makes false teeth, dentures or bridges	5.4	4.9	11.0	19.8	11.3
Makes false teeth, dentures or bridges for dentists	.0	1.3	4.9	8.9	4.9
Repairs false teeth, dentures or bridges	2.7	1.1	2.1	2.9	2.1
Repairs false teeth, dentures or bridges for dentists	.0	.1	.4	.7	.4
Works with x-rays	2.7	.6	1.6	2.4	1.5
Takes impressions	.0	.3	.5	1.0	.6
Other nontechnician dental activities	2.7	.5	1.2	2.7	1.3
Not elsewhere classified	.0	.7	1.3	2.7	1 4
No answer	86.5	92.4	81.6	66.8	81.1

response to the question "Are you acquainted with the working relationship between the dentist and the dental laboratory technician?" (Table 13). Again, the percentage of affirmative answers was higher in the western and eastern states than in the central and southern states. The percentage of affirmative answers varied greatly with family income, from 2.2 per cent for the "under $1,000" category to 18.3 per cent where family income was over $10,000. A correlation of similar degree prevailed between the "working relationship" question and educational level of the respondent.

Respondents who indicated they knew the working relationship between the dentist and the technician were asked to describe that working relationship. As shown in Tables 14 and 15, many of the replies to this question were similar to the replies to the question on the "kind of work" performed by the technician. Although not many respondents ventured to describe the working relationship, more than two thirds of those who did stated that the technician made dentures and bridges for the dentist. Eighty-seven people (1.3 per cent) stated that the dentist and technician "worked together" and 39 stated that the technician worked under supervision of the dentist. Ten stated that the dentist sent his patients to the laboratory.

The majority of respondents indicated they did not know the answer to the question "Are any persons other than dentists allowed by law in your state to provide false teeth directly to the public?" (Tables 16 and 17). Nationally, 4.3 per cent of the respondents checked "yes," and this figure varied regionally from 2.0 per cent in the Southwest to 6.4 per cent in New England. The correct answer to this question, "no," was given by 24.8 per cent of the respondents. This figure varied by educational

Table 13 • Percentage distribution of respondents according to replies to the question "Are you acquainted with the working relationship between the dentist and the dental laboratory technician?" by region

Region	Response			Total
	Yes	No	No answer	
New England	13.1	85.5	1.4	100.0
Middle East	13.1	84.9	2.0	100.0
Southeast	8.5	90.2	1.3	100.0
Southwest	8.2	89.7	2.1	100.0
Central	11.4	86.5	2.1	100.0
Northwest	8.7	89.1	2.2	100.0
FarWest	14.4	84.2	1.4	100.0
United States	11.6	86.6	1.8	100.0

Table 14 • Percentage distribution of respondents giving specified explanations of the working relationship between the dentist and the dental laboratory technician, by family income

Explanation	Family income									All respondents
	Under $1,000	$1,000–$1,999	$2,000–$2,999	$3,000–$3,999	$4,000–$4,999	$5,000–$5,999	$6,000–$6,999	$7,000–$9,999	$10,000 and over	
Technician makes dentures, bridges, etc.	.7	.6	.5	.7	.6	.5	.5	.4	.8	.6
Technician makes dentures, bridges, etc., for the dentist	.7	1.5	3.7	5.7	7.5	9.6	9.8	10.5	11.5	7.7
Technician repairs dentures, bridges	.0	.2	.2	.3	.2	.2	.3	.4	.2	.2
Technician repairs dentures, bridges for the dentist	.0	.2	.2	.7	.4	.3	.8	.2	.3	.4
Technician is under dentist supervision	.7	.8	.2	.1	.3	.6	.5	.9	1.1	.6
They work together in making dentures, bridges, repairs	.0	.2	.2	.4	.7	.6	.7	.8	.5	.6
They work together	.0	.4	.3	.8	.4	.9	.8	1.0	1.1	.7
Dentist sends patients to the laboratory	.0	.0	.1	.0	.3	.2	.1	.2	.2	.1
Not elsewhere classified	.0	.8	1.0	1.0	1.7	.3	.8	1.5	2.8	1.2
No answer	97.8	95.6	93.9	91.3	89.0	87.2	86.7	85.4	82.5	88.8

Table 15 • Percentage distribution of respondents giving specified explanations of the working relationship between the dentist and the dental laboratory technician, by educational level of respondent

Explanation	Educational level				All respondents
	No formal schooling	Some or all of elementary school	Some or all of high school	Some or all of college	
Technician makes dentures, bridges, etc.	2.7	.6	.7	.2	.6
Technician makes dentures, bridges, etc., for the dentist	.0	2.6	7.9	13.0	7.7
Technician repairs dentures, bridges	.0	.3	.2	.2	.2
Technician repairs dentures, bridges for the dentist	.0	.1	.4	.5	.4
Technician is under dentist supervision	.0	.2	.4	1.6	.6
They work together in making dentures, bridges, repairs	.0	.1	.7	.7	.6
They work together	.0	.5	.7	1.1	.7
Dentist sends patients to the laboratory	.0	.1	.1	.3	.1
Not elsewhere classified	2.7	.5	1.2	1.9	1.2
No answer	94.6	95.6	88.5	81.4	88.8

level from 18.9 per cent of respondents with no formal schooling to 27.9 per cent of respondents who had gone to college.

To the question "Has a dentist ever sent you to a dental laboratory?" 4.1 per cent answered in the affirmative (Table 18). The figure was relatively

Table 16 • Percentage distribution of respondents according to replies to the question "Are any persons other than dentists allowed by law in your state to provide false teeth directly to the public?" by region

Region	Response			Total
	Yes	No	Don't know or no answer	
New England	6.4	28.5	65.1	100.0
Middle East	4.5	29.4	66.1	100.0
Southeast	2.4	23.8	73.8	100.0
Southwest	2.0	25.7	72.3	100.0
Central	5.3	19.5	75.2	100.0
Northwest	3.8	23.0	73.2	100.0
Far West	4.5	26.8	68.7	100.0
United States	4.3	24.8	70.9	100.0

Table 17 • Percentage distribution of respondents according to replies to the question "Are any persons other than dentists allowed by law in your state to provide false teeth directly to the public?" by educational level of respondent

Educational level	Response			Total
	Yes	No	Don't know or no answer	
Nor formal schooling	2.7	18.9	78.4	100.0
Some or all of elementary school	3.5	21.1	75.4	100.0
Some or all of high school	4.6	25.1	70.3	100.0
Some or all of college	4.4	27.9	67.7	100.0
All respondents	4.3	24.8	70.9	100.0

low in the Southeast (2.3 per cent). In the Far West, the figure was 7.2 per cent, considerably higher than in any other region.

The statistics presented in this chapter indicate a rather low level of knowledge of the training and role of the dental laboratory technician. While overestimating the technician's education, people underestimated that of the dentist by an average of about 2.5 years. Only one fifth of the people knew anything about the work performed by a dental technician and only about half this number were acquainted with the working relationship between the dentist and the technician. Seventy per cent of the respondents did not know, or declined to answer, whether any persons other than dentists were allowed by law in their state to provide dentures directly to the public.

There was a distinct correlation between economic-educational level and knowledge of the role of the dental technician. Even in the upper levels of income and education, however, the majority of respondents did not have the correct answers to the questions relating to the role of the dental technician.

The next chapter in this series will present information on the number of people wearing dentures and bridges and the source of dentures.

Table 18 • Percentage distribution of respondents according to replies to the question "Has a dentist ever sent you to a dental laboratory?" by region

Region	Response			Total
	Yes	No	No answer	
New England	4.5	92.7	2.8	100.0
Middle East	3.9	93.3	2.8	100.0
Southeast	2.3	94.1	3.6	100.0
Southwest	3.4	94.1	2.5	100.0
Central	3.3	92.9	3.8	100.0
Northwest	2.7	96.7	.6	100.0
Far West	7.2	90.3	2.5	100.0
United States	4.1	92.9	3.0	100.0

book reviews

PRINCIPLES OF NUTRITION

By Eva D. Wilson, Katherine H. Fisher and Mary E. Fuqua. 483 pages with 141 figures. Glossary. Index. $5.95. New York, John Wiley & Sons, Inc., 1959.

This new book gives an up-to-date, comprehensive review of the principles of nutrition. While it is designed chiefly as a college text, any person sincerely interested in the subject would find it valuable for study or for reference. The first part of the book covers basic information on energy metabolism and the food nutrients. Later chapters deal with the application of nutrition principles to the needs of children, women during pregnancy and lactation, elderly persons, and obese individuals.

One chapter is devoted to the relation of diet to dental health. In this chapter, the authors consider the following topics: structure and development of the tooth; factors influencing the incidence of dental caries; the influence of tooth structure on resistance to caries; fluorine and dental caries, and diet and health of periodontal tissues.

The 24 chapters of this book are directed primarily to the person who has had little or no background in chemistry or physiology. However, the authors have not avoided concepts drawn from chemistry and physiology, which are basic to an understanding of nutrition. Rather, they have clarified the concepts through various devices; for example, an excellent glossary, one entire chapter devoted to a discussion of unfamiliar terms, and many unusual illustrations and diagrammatic drawings.

The appendix to the book includes: the Table of Recommended Dietary Allowances proposed by the Food and Nutrition Board of the National Research Council; tables of desirable weights for men and for women; a short method for dietary analysis, and an extensive table giving the nutritive values for common foods in familiar household units.

Ethel Austin Martin

ANATOMY AND PHYSIOLOGY, VOLUME 2

By Edwin B. Steen, Ph.D., and Ashley Montague, Ph.D. 314 pages. Illustrated. Index. $2.50. New York, Barnes & Noble, 1959.

This volume includes the Urinary, Respiratory, Nervous, Endocrine and Reproductive chapters of the two-volume set belonging to the "College Outline Series."

The treatment is clear and the illustrations well-chosen. Recent changes in terminology are brought together in an appendix. Terminology and definitions are stressed throughout and tables of significant data are freely used. As a supplement and guide to a standard textbook, these two volumes may well be of great value to the college student.

John A. Cameron

ATLAS OF CLINICAL PATHOLOGY OF THE ORAL MUCOUS MEMBRANE

By Balint J. Orban and Frank M. Wentz. 148 pages with 87 colored illustrations and 147 black and white illustrations. $14.50. St. Louis, C. V. Mosby Co., 1960.

This is the second edition of this textbook which was first published in 1955. The style and purpose have not been changed in this new edition, but certain additions and improvements have been made by the authors. For example, the number of oral diseases discussed has been increased from 66 in the first edition to 74 in the second edition. Two color photomicrographs have been added, illustrating the *Histoplasma* and *Blastomyces* organisms in oral lesions as stained by the P.A.S. method. The treatment of several conditions has been revised to take into account newer methods of therapy. A few minor modifications of disease classification have been made, for example: eosinophilic granuloma is now listed under reticuloendotheliosis and lichen sclerosis

et atrophicus has been added to dystrophic conditions.

The color illustrations of many clinical lesions are improved over those in the first edition; the engraving plates have been modified so that truer colors have resulted. The authors reiterate in the preface to the second edition that the purpose of this text is to serve the practitioner as a chairside assistant in oral diagnosis. As a supplement to more detailed texts on oral diagnosis and oral pathology, this atlas adequately fulfills its purpose.

Eugene R. Zimmermann

IN THE DENTIST'S OFFICE

G. Archanna Morrison. Second edition. 280 pages with 41 illustrations. Index. $7.50. Philadelphia, J. B. Lippincott Co., 1959.

Increasing the knowledge and efficiency of our auxiliary dental personnel is the objective of this splendid book which contains logical and explicit presentation of the subject matter.

The 16 chapters with adequate phraseology and sequence of chapters which provide unusually good continuity begin with a list of 13 important qualities which, when achieved, will make the dental assistant, the secretary or the hygienist better than average in any dental office.

This lucid chapter precedes discussions of dental anatomy, tested phrases for personnel, important factors in accepted sterilization methods, technics for mixing dental materials, the processing of roentgenographic films, practical suggestions for appointment book control, dental supplies, including the assistant's important responsibility in attention to this area of dental practice, collections and collection letters, tact and contact on the telephone and in the reception room, recall letters, nutrition, presentation of treatment plans, children in the dental practice, and other helpful hints.

There are six contributions by outstanding dental practitioners, all of which, particularly the one written by Fred D. Miller, on nutrition, provide a good résumé and basic information which will aid the dental assistant in becoming more proficient.

In this, the author's second edition, beautifully illustrated, it is obvious that clear writing has been made possible by clear thinking.

All thoughtful dentists would do well to read this discriminating and valuable book. It will give them a clearer conception of vital aspects concerning the responsibilities of auxiliary dental personnel. *Lloyd H. Dodd*

HYPNOSIS IN GENERAL DENTAL PRACTICE

By Thomas W. Frost. 128 pages with 34 illustrations. Index. $4.50. Chicago, Year Book Publishers, Inc., 1959.

Among the multitude of books relevant to the subject, this volume is one of the few devoted entirely to dental applications of hypnosis. The author presupposes a basic knowledge of hypnosis on the part of the reader, thus permitting a concise, direct, and well-organized consideration of the dental aspects of his subject. The fundamentals of induction and deepening of the trance state are carefully and clearly reviewed. The technics outlined conform to generally accepted procedures which the author has skillfully applied to the everyday problems of dental practice. The subject of dental hypnosis for children is particularly well presented.

A conservative and sensible approach is taken in regard to the limitations of hypnosis, the responsibility of the dentist in electing to utilize hypnosis as an auxiliary to his armamentarium, and in regard to the refractory hypnotic subject.

A detailed table of contents, limited but authoritative references, and an adequate index permit easy reading and ready reference.

In summary, we might say that *Hypnosis in General Dental Practice* gleans the essentials of hypnosis and applies them in a highly competent manner to the practice of dentistry. It will serve as an excellent guide book for the beginner in dental hypnosis and will provide the more experienced practitioner with a convenient reference. *W. O. Ramsey*

PARTIAL DENTURES

By John Osborne, Ph.D., M.D.S., and George Alexander Lammie, Ph.D., M.D.S. 446 pages with 246 illustrations. Index. $10.50. Springfield, Ill., Charles C Thomas, 1959.

This book with 21 chapters and 246 very good illustrations is one that should be read and analyzed by clinical students, practitioners and dental teachers. It is concise and easy to read. The illustrations with their captions are very informative. Emphasis rightly is placed on the biological aspects of partial dentures rather than on the mechanical aspects. All phases of partial dentures as related to the patient are well covered. This reviewer was greatly impressed by the chapters concerning prognosis, diagnosis, treatment planning and mouth preparation. Other chapters include such subjects as surveying, occlusion, esthetics and the treatment of given cases. *R. W. Mitchener*

deaths

BUREAU OF MEMBERSHIP RECORDS

Allison, David T., Honea Path, S. C.; Atlanta Dental College, 1910; died August 14; age 72.

Ames, William F., New Kensington, Pa.; University of Pittsburgh School of Dentistry, 1936; died August 4; age 47.

Arden, Joseph G., Chicago; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1919; died August 23; age 61.

Arnold, Howard B., North Arlington, N. J.; University of Pennsylvania School of Dentistry, 1910; died August 7; age 77.

Arthur, Robert B., Toledo, Ohio; Ohio State University College of Dentistry, 1928; died September 2; age 55.

Baker, Harry W., Cincinnati; Northwestern University Dental School, 1915; died July 27; age 74.

Barrett, Elmer H., Gainesville, Mo.; Kansas City-Western Dental College, 1929; died July 21; age 64.

Beauchamp, Telle A., Shreveport, La.; Tulane University School of Dentistry, 1919; died July 5; age 61.

Bell, Temple E., Sherman Oaks, Calif.; Kansas City-Western Dental College, 1927; died July 28; age 61.

Benson, Joseph G., Brooklyn; New York College of Dentistry, 1923; died August 1; age 65.

Benson, Russell H., Madisonville, Ky.; Louisville College of Dentistry, 1912; died August 19; age 71.

Benton, Culmer C., La Jolla, Calif.; University of Pennsylvania School of Dentistry, 1914; died July 20; age 68.

Binns, Edwin V., Aberdeen, Md.; Baltimore College of Dental Surgery, University of Maryland, 1926; died August 28; age 62.

Bolen, William R., Indianapolis; Indiana University School of Dentistry, 1925; died August 16; age 67.

Brix, Arthur D., St. Louis, Mo.; Marion-Sims Dental College, 1904; died July 27; age 76.

Brown, John V., Kansas City, Mo.; Kansas City-Western Dental College, 1920; died August 24; age 64.

Bryant, Douglas O., Stockton, Ala.; Birmingham Dental College, 1905; died August 31; age 80.

Bullis, Rexford L., Berlin, Wis.; Marquette University School of Dentistry, 1918; died August 29; age 65.

Callahan, James H., Bridgeport, Conn.; University of Pennsylvania School of Dentistry, 1897; died August 18; age 86.

Cameron, Robert C., Defiance, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1903; died August 18; age 80.

Chait, William H., Albany, N. Y.; University of Pennsylvania School of Dentistry, 1930; died August 2; age 52.

Clark, Ted R., Marseilles, Ill.; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1929; died August 10; age 57.

Clark, William P., Clairton, Pa.; University of Pittsburgh School of Dentistry, 1928; died August 14; age 59.

Clarke, Dugald W., Norwich, Conn.; Temple University School of Dentistry, 1917; died August 9; age 69.

Clyne, Wade C., Joliet, Ill.; Chicago College of Dental Surgery, 1912; died Sept. 1; age 76.

Coffin, Glenn E., Alhambra, Calif.; University of Southern California School of Dentistry, 1926; died July 31; age 56.

Condren, James E., Erie, Pa.; Philadelphia Dental College, 1905; died July 3; age 80.

Corcoran, Christopher G., Gallup, N. M.; Marquette University School of Dentistry, 1924; died August 16; age 64.

Cronauer, Frank A., Wilkes-Barre, Pa.; Baltimore College of Dental Surgery, University of Maryland, 1925; died September 9.

Cruttenden, Louis M., Berkeley, Calif.; University of Minnesota School of Dentistry, 1916; died August 8; age 66.

Cunningham, William J., New York; New York College of Dentistry, 1919; died August 16; age 67.

Cutler, Donald N., Tampa, Fla.; University of Detroit School of Dentistry, 1947; died July 25; age 50.

Cutler, Everett W., Portland, Ore.; North Pacific College of Oregon School of Dentistry, 1925; died August 12; age 73.

Cyrier, Oscar, Chicago; Chicago College of Dental Surgery, 1914; died September 7; age 73.

Davis, William C., Cleveland; Western Reserve University School of Dentistry, 1919; died August 19; age 64.

Deichmann, Jr., George L., Baltimore; Baltimore College of Dental Surgery, University of Maryland, 1924; died May 18; age 59.

Denneen, Joseph B., Buffalo; University of Buffalo School of Dentistry, 1923; died September 2; age 62.

Di Bartolo, Anthony C., Sulphur, La.; died August 13; age 51.

Dillard, Louis A., Roseburg, Ore.; North Pacific College of Oregon School of Dentistry, 1917; died August 5; age 67.

Doty, Almon P., North Plainfield, N. J.; Baltimore College of Dental Surgery, University of Maryland, 1927; died September 5; age 63.

Douglas, Ernest G., Chateaugay, N. Y.; University of Maryland, Dental Department, 1906; died August 23; age 77.

Douglass, Charles C., Elizabethtown, Pa.; Temple University School of Dentistry, 1928; died August 29; age 55.

Dowd, Thomas F., Newton Center, Mass.; Tufts College Dental School, 1919; died July 28; age 65.

Dunning, Walter L., Chalfont, Pa.; University of Iowa College of Dentistry, 1902; died June 4; age 81.

Eisinger, Benjamin, New York; New York College of Dentistry, 1913; died August 11; age 84.

Ernst, Frank J., St. Marys, Pa.; University of Pennsylvania School of Dentistry, 1917; died August 26; age 70.

Ferris, Wilamina, Portland, Ore.; died August 14; age 84.

Fisher, Edwin P., Weehawken, N. J.; New York College of Dentistry, 1908; died July 29; age 73.

Fouch, Ora B., Anderson, Ind.; Western Dental College, 1902; died May 17; age 83.

Frederick, Richard J., Ashtabula, Ohio; Western Reserve University School of Dentistry, 1930; died August 30; age 53.

Fritz, William, San Jose, Calif.; New York College of Dentistry, 1923; died July 24; age 62.

Frost, Alfred C., East Liverpool, Ohio; Western Reserve University School of Dentistry, 1908; died July 1; age 75.

Gargan, John F., Greenwich, Conn.; Georgetown University School of Dentistry, 1914; died August 17; age 72.

Gibson, Richard M., Oakland, Calif.; Temple University School of Dentistry, 1923; died July 26; age 61.

Gilbert, Alfred H., San Diego, Calif.; University of Pennsylvania School of Dentistry, 1900; died September 10; age 84.

Goodman, Saul, Nutley, N. J.; Columbia University School of Dental and Oral Surgery, 1923; died August 28; age 60.

Gorgen, Edward, Bloomington, Minn.; University of Minnesota School of Dentistry, 1899; died July 22; age 88.

Greenstone, Louis A., Mohegan Lake, N. Y.; New York College of Dentistry, 1911; died April 7; age 75.

Grindle, Walter H., Beloit, Kan.; Western Dental College, 1908; died August 5; age 75.

Gurr, George T., Columbus, Ga.; Atlanta Dental College, 1899; died July 27; age 85.

Guy, Manuel D., Aledo, Ill.; St. Louis University School of Dentistry, 1928; died August 18; age 57.

Haas, Harry B., Lorain, Ohio; Western Reserve University School of Dentistry, 1919; died September 1; age 64.

Haines, Bert, New York; New York College of Dentistry, 1919; died April 5; age 64.

Hamby, Samuel M., Portland, Ore.; Western Dental College, 1897; died July 25; age 88.

Hammond, Bennett, Washington, D. C.; University of Maryland, Dental Department, 1921; died August 14; age 71.

Hardage, Albert L., Hope, Ark.; Baylor University College of Dentistry, 1939; died August 7; age 52.

Harris, Caspar, Boston; Tufts College Dental School, 1918; died July 29; age 65.

Hart, Archie J., Monterey, Calif.; University of California College of Dentistry, 1929; died August 5; age 54.

Harter, John G., Mount Carmel, Pa.; died May 29; age 90.

Hartigan, Thomas J., Newtonville, Mass.; Tufts College Dental School, 1911; died August 19; age 70.

Hawley, George H., Roxbury, Mass.; died August 18; age 82.

directory

OFFICERS

Charles H. Patton, D.D.S., President.....1702 Locust St., Philadelphia
John R. Abel, D.D.S., President-Elect.....10231 Santa Monica Blvd., Los Angeles
John B. Wilson, D.D.S., First Vice-President.....1427 San Marino Ave., San Marino, Calif.
Russell I. Todd, D.D.S., Second Vice-President.....Western Union Bldg., Richmond, Ky.
Clarence S. Renouard, D.D.S., Third Vice-President.....Phoenix Bldg., Butte, Mont.
Gerald D. Timmons, D.D.S., Speaker, House of Delegates....3223 N. Broad St., Philadelphia
Harold Hillenbrand, D.D.S., Secretary.....222 E. Superior St., Chicago
H. B. Washburn, D.D.S., Treasurer.....Lowry Medical Arts Bldg., St. Paul
Lon W. Morrey, D.D.S., Editor.....222 E. Superior St., Chicago

BOARD OF TRUSTEES

John S. Eilar, D.D.S., 1963, Twelfth District..7 Medical Arts Sq., N.E., Albuquerque, N.Mex.
Edward F. Mimmack, D.D.S., 1963, Second District.....191 North St., Buffalo, N.Y.
Fritz A. Pierson, D.D.S., 1963, Eleventh District.....Federal Securities Bldg., Lincoln, Neb.
Roger K. Trueblood, D.D.S., 1963, Thirteenth District.....107 E. "A" Ave., Glendale, Ariz.
Aloyse E. Kopp, D.D.S., 1962, Ninth District.....Wells Bldg., Milwaukee
William A. Garrett, D.D.S., 1962, Fifth District.....Candler Bldg., Atlanta, Ga.
Laurence L. Lathrop, D.D.S., 1962, Third District.....24 W. Fourth St., Emporium, Pa.
Paul K. Musselman, D.D.S., 1962, Fourth District.....143 W. Main St., Newark, Del.
Robert J. Wells, D.D.S., 1962, Eighth District.....1525 E. 53rd St., Chicago
Arthur W. Easton, D.M.D., 1961, First District.....12 Pearl St., Norway, Maine
Maynard K. Hine, D.D.S., 1961, Seventh District.....1121 W. Michigan St., Indianapolis
E. Jeff Justis, D.D.S., 1961, Sixth District.....Exchange Bldg., Memphis, Tenn.
Henry M. Willits, D.D.S., 1961, Tenth District.....Roshek Bldg., Dubuque, Iowa

ASSISTANT SECRETARIES

C. Gordon Watson, D.D.S., 222 E. Superior St., Chicago
Gory N. Casto, Jr., D.M.D., 222 E. Superior St., Chicago
Shailer A. Peterson, Ph.D., Educational Affairs, 222 E. Superior St., Chicago
Bernard J. Conway, LL.B., Legal Affairs, 222 E. Superior St., Chicago
J. Roy Doty, Ph.D., Research and Therapeutics, 222 E. Superior St., Chicago
C. Willard Camalier, D.D.S., Washington Office, 806 Connecticut Ave., N.W., Washington, D.C.

BUREAUS

Audiovisual Service: Herbert Jackman, Ph.B., Director, 222 E. Superior St., Chicago

Dental Health Education: Perry J. Sandell, M.A., Director, 222 E. Superior St., Chicago

Economic Research and Statistics: B. D. Moen, M.A., Director, 222 E. Superior St., Chicago

Library and Indexing Service: Donald A. Washburn, D.D.S., Director, 222 E. Superior St., Chicago

Membership Records: Georgia Christman (Mrs.), Director, 222 E. Superior St., Chicago

Public Information: Peter C. Goulding, B.A., Director, 222 E. Superior St., Chicago

COUNCILS

Constitution and Bylaws: C. M. Taylor, D.D.S., Chm., Esperson Bldg., Houston, Texas

Dental Education: Leslie M. FitzGerald, D.D.S., Chm., Roshek Bldg., Dubuque, Iowa
Shailer Peterson, Ph.D., Secy., 222 E. Superior St., Chicago

Dental Health: R. W. Openshaw, D.D.S., Chm., 6703 Melrose Ave., Los Angeles

Dental Research: W. F. Swanson, D.D.S., Chm., University of Pittsburgh, School of Dentistry, Pittsburgh
Sholom Pearlman, D.D.S., M.S., Secy., 222 E. Superior St., Chicago

Dental Therapeutics: Floyd D. Ostrander, D.D.S., Chm., University of Michigan Dental School, 625 E. Liberty, Ann Arbor, Mich.
J. Roy Doty, Ph.D., Secy., 222 E. Superior St., Chicago

Dental Trade and Laboratory Relations: J. Eugene Ziegler, D.D.S., Chm., 3875 Wilshire Blvd., Los Angeles
John P. Noone, LL.B., Secy., 222 E. Superior St., Chicago

Federal Dental Services: Thomas F. Powers, D.D.S., Chm., 819 Park Ave., Plainfield, N.J.
Herbert C. Lassiter, LL.B., Secy., 222 E. Superior St., Chicago

Hospital Dental Service: O. J. McCormack, D.D.S., Chm., Keith Theatre Bldg., Syracuse, N.Y.
Gerard J. Casey, D.D.S., Secy., 222 E. Superior St., Chicago

Insurance: Harold M. Flickinger, D.D.S., Chm., P.O. Box 9, Siloam Springs, Ark.
Herbert C. Lassiter, LL.B., Secy., 222 E. Superior St., Chicago

International Relations: Carl L. Sebelius, D.D.S., Chm., Division of Dental Health, State Department of Public Health, Cordell Hull Bldg., Nashville, Tenn.
Gory N. Casto, Jr., D.M.D., Secy., 222 E. Superior St., Chicago

Journalism: Isaac Sissman, D.D.S., Chm., Jenkins Arcade, Pittsburgh
Velma M. Child (Mrs.), Secy., 222 E. Superior St., Chicago

Judicial: C. E. Rutledge, D.D.S., Chm., 2500 Bissell Ave., Richmond, Calif.
Bernard J. Conway, LL.B., Secy., 222 E. Superior St., Chicago

Legislation: Matthew Besdine, D.D.S., Chm., 1182 Dean St., Brooklyn
Hal M. Christensen, LL.B., Secy., 222 E. Superior St., Chicago

National Board of Dental Examiners: Harry Blechman, D.D.S., Chm., 205 E. 78th St., New York
Grace Parkin (Mrs.), B.A., B.S., Secy., 222 E. Superior St., Chicago

Relief: H. R. Bleier, D.D.S., Chm., 4177 N. Oakland Ave., Milwaukee

Scientific Session: Jarvis Williams, D.D.S., Chm., 6535 Wenonga Terrace, Kansas City 15, Mo.
Gory N. Casto, Jr., D.M.D., Secy., 222 E. Superior St., Chicago

SECTION CHAIRMEN

Anesthesiology: Harry M. Seldin, D.D.S., 57 W. 57th St., New York

Operative Dentistry: John H. Mosteller, D.D.S., 1729 Springhill Ave., Mobile, Ala.

Oral Surgery: Gustav O. Kruger, D.D.S., Georgetown University School of Dentistry, 3900 Reservoir Rd., N.W., Washington 7, D.C.

Orthodontics and Oral Development: Michael Maxian, D.D.S., 211 Park Ave., Manhasset, L.I., New York

Pedodontics: Norman Olsen, D.D.S., 636 Church St., Evanston, Ill.

Periodontics: Claud M. Fraleigh, D.D.S., School of Dentistry, West Virginia University, Morgantown, W.Va.

Practice Administration: Clarence E. Rutledge, D.D.S., 2500 Bissell St., Richmond 2, Calif.

Prosthodontics, Complete: Philip G. Vierheller, D.D.S., 818 Olive St., St. Louis 1

Prosthodontics, Partial: John F. Johnston, D.D.S., Indiana University School of Dentistry, 1121 W. Michigan St., Indianapolis 2

Public Health: John K. Peterson, D.D.S., Division of Dental Health, North Dakota State Department of Health, 1202 Third St., N., Bismarck, N.D.

Research: Seymour J. Kreshover, D.D.S., National Institute of Dental Research, Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health, Bethesda 14, Maryland

Roentgenology: Arnol R. Neely, D.M.D., University of Oregon Dental School, 611 S.W. Campus Dr., Sam Jackson Park, Portland, Ore.

THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
222 East Superior Street, Chicago 11, Illinois
WHitehall 4-6730

LON W. MORREY, D.D.S., *Editor* JOHN E. RUSH, *Business Manager*

All expressions of opinion and statements of supposed fact are published on the authority of the writer over whose signature they appear and are not to be regarded as expressing the views of the American Dental Association, unless such statements or opinions have been adopted by the Association. Articles are accepted with the understanding that they have not been published previously and that they are submitted solely to The Journal. The Journal of the American Dental Association is indexed in the Index to Dental Literature and, in part, in the Index Medicus, Biological Abstracts and Chemical Abstracts.

Advertising copy must conform to the official standards established by the American Dental Association. Advertising forms close the 20th of the second month preceding issue. Rates and other information pertaining to advertising should be addressed to: John J. Hollister, director of Advertising and Exhibits. Notice of change of address should be received one month before the change is to be effective. Orders for reprints of Journal articles must be received by the Business Manager's office not later than the 15th of the month of issue in order to secure advantage of the lowest possible prices. Orders received after this date are subject to special quotation.

SPECIAL OFFER

TO THE DENTAL PROFESSION

COMBINATION OF:
12 Nylon Straight-Line Design Children's Brushes
and
12 Tubes of Professional Size, .63 ounces, Kolynos Toothpaste

$1.60 per dozen
3 doz. minimum order

Mothers will appreciate your thoughtfulness in giving their children one of these first-line quality toothbrushes with a tube of tasty Kolynos Toothpaste. And the youngsters will like the idea of receiving a 'gift' from you—a gift which will also furnish an added inducement to more thorough and faithful brushing.

★ *Order today in quantities of 3 doz. or in gross lots. Dept. JK, Whitehall Laboratories, Inc., 22 E. 40th St., New York 16, N.Y.*

***Kolynos*—accepted for advertising by the American Dental Association**

announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

One-Hundred and Second Annual Session	October 16-19, 1961	Philadelphia
One-Hundred and Third Annual Session	October 29-November 1, 1962	Miami Beach, Fla.
One-Hundred and Fourth Annual Session	October 14-17, 1963	Atlantic City, N.J.
One-Hundred and Fifth Annual Session	November 9-12, 1964	San Francisco

MEETINGS OF CONSTITUENT SOCIETIES

State	*Date*	*Place*	*Secretary and Address*
Alabama	Apr. 24-26	Mobile	C. R. Crook, Professional Center, Montgomery
Alaska	July 10-12	Anchorage	W. E. Alexander, 406 G St., Anchorage
Arizona	Apr. 12-15	Phoenix	J. F. Vaughn, 2727 N. Central Ave., Phoenix
Arkansas	Apr. 9-12	Little Rock	D. M. Hamm, Box 89, Clarksville
California	Apr. 16-19	San Francisco	W. J. Healy, 518 Sutter St., San Francisco 2
S. California	Apr. 24-26	Los Angeles	J. H. Thomason, 903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 1-4	Colorado Springs	G. H. Siersma, 903 Republic Bldg., Denver 2
Connecticut	May 10, 11	Hartford	E. S. Arnold, 37 Linnard Rd., W. Hartford
Delaware	June 9, 10	Wilmington	W. W. Flanagan, Jr., 309 S. State, Dover
Dist. of Columbia	Mar. 12-15	Washington	B. D. Mattox, 1835 Eye St., N.W., Washington 6
Florida	May 21-24	Miami Beach	E. M. Farber, 518 Tampa St., Tampa
Georgia	Oct. 1-4	Atlanta	F. M. Butler, Jr., 701 Southern United Bldg., Macon
Hawaii	June 18	Honolulu	J. H. Dawe, 291 Alexander Young Bldg., Honolulu 13
Idaho	Sept. 4-6	Sun Valley	H. E. Burgess, 151 Fourth Ave., N., Twin Falls
Illinois	May 8-10	Peoria	P. W. Clopper, 632 Jefferson Bldg., Peoria
Indiana	May 14-17	Indianapolis	C. L. Howell, 1012 Hume Mansur Bldg., Indianapolis 4
Iowa	May 1-3	Des Moines	H. N. Hake, 639 Insurance Exchange Bldg., Des Moines 9
Kansas	May 7-9	Kansas City, Mo.	F. A. Richmond, Brotherhood Bldg., Kansas City 1
Kentucky	Apr. 9-12	Louisville	A. B. Coxwell, Jr., 2208 Dundee Rd., Louisville 5
Louisiana	May 5-7	Lafayette	J. S. Bernhard, 231 Atkins Ave., Shreveport 26
Maine	June 15-17	Rockland	S. M. Gower, 6 Coburn Ave., Skowhegan
Maryland	May 7-10	Baltimore	W. Schunick, 19 Medical Arts Bldg., Baltimore 1
Massachusetts	Apr. 30-May 3	Boston	H. E. Tingley, 227 Commonwealth Ave., Boston
Michigan	Apr. 10-12	Detroit	F. Wertheimer, Michigan Dept. of Health, Lansing
Minnesota	Apr. 17-19	Minneapolis	C. V. E. Cassel, 2236 Marshall Ave., St. Paul 4W
Mississippi	June 25-28	Biloxi	M. C. O'Keefe, Medical Arts Bldg., Jackson 2
Missouri	May 7-10	Kansas City	E. D. Suggett, Merchants Bank Bldg., Jefferson City

KARIDIUM®

NOW in 2 DOSAGE FORMS...

LIQUID

Especially convenient when administering the fluoride ion to infants. Each 8 drops — in formula, water, fruit juice, etc. — yields 1 mg. fluoride ion, each 4 drops 1/2 mg. etc.

Dosage easily adjusted for those areas having some natural fluoride in the water.

In 2 oz. unbreakable, spill-proof polyethylene bottles with built-in dropper. Yields approximately 118 mgs. fluoride ion.

TABLETS

Each tablet yields 1 mg. fluoride ion. Completely soluble. Tablets may be more convenient than pediatric drops for older children.

Usual Rx where water is substantially devoid of fluoride, (.3 p.p.m. or less) 1 tablet per day. From .3 p.p.m. to .7 p.p.m., 1 tablet every other day.

In clear glass bottles of 180 and 1,000 tablets . . . each tablet yielding approximately 1 mg. fluoride ion.

USE EITHER FOR THE SYSTEMIC CONTROL OF DENTAL CARIES

Remember, even though fluoridated water may be unavailable, the benefits of fluoride can be obtained through the conscientious use of fluoride throughout the period of tooth formation. A recent study by the National Institute of Dental Research compares the ingestion of daily fluoride tablets favorably (in the reduction of tooth decay) with the rate for children using fluoridated drinking water. The tablets did not appear to cause any cosmetically significant fluorosis.

Karidium, as with all Rx items, should be kept out of reach of children. However, the patented composition of Karidium Tablets provides protection against accidental poisoning in that the combination of fluoride and the vehicle, sodium **chloride**, cause emesis when a large number of tablets are consumed.

℞ KARIDIUM!

Samples, literature and schedules are available to physicians and dentists from:

The LORVIC Corporation
5553 EASTON AVENUE • ST. LOUIS 12, MISSOURI, U.S.A.
IN CANADA: PROFESSIONAL PHARMACEUTICAL CORP., MONTREAL 26, QUEBEC

State	Date	Place	Secretary and Address
Montana	May 4-6	Great Falls	R. C. Ritter, 1236 N. 28th St., Billings
Nebraska	Apr. 24-26	Lincoln	F. A. Pierson, Federal Securities Bldg., Lincoln
Nevada	Apr. 30-May 2	Las Vegas	O. M. Seifert, 821 Ryland Ave., Reno
New Hampshire	June 18-20	Whitefield	F. E. Williams, 517 Milton St., Manchester
New Jersey	May 14-17	Atlantic City	J. G. Carr, 407 Cooper St., Camden 2
New Mexico	May 10-13	Albuquerque	E. P. Purtell, 2917 Santa Cruz Ave., S.E., Albuquerque
New York	May 15-17	Syracuse	C. A. Wilkie, 268 Ashland Pl., Brooklyn 17
North Carolina	May 14-17	Pinehurst	S. B. Towler, P.O. Box 11065, Raleigh
North Dakota	Sept. 10-12	Fargo	D. R. Perry, Box 866, Bismarck
Ohio	Nov. 5-8	Columbus	E. G. Jones, 185 E. State St., Columbus
Oklahoma	Apr. 23-26	Tulsa	W. C. Hopkins, 210 Plaza Court Bldg., Oklahoma City
Oregon	Mar. 6-8	Portland	T. D. Holder, Selling Bldg., Portland
Panama C. Z.	Jan. 9	Albrook Air Force Base	H. L. Mertz, Jr., P.O. Box 1417, Balboa
Pennsylvania	May 18, 19	Hershey	I. Sissman, 217 State St., Harrisburg
Puerto Rico	Jan. 22-25	San Juan	R. Gonzalez R., Box 10452, Caparra Heights
Rhode Island	Jan. 17, 18	Providence	E. M. Nelson, 901 Union Trust Bldg., Providence
South Carolina	May 7-10	Columbia	J. E. Wallace, 1506 Gregg St., Columbia
South Dakota	May 14-16	Aberdeen	R. E. Decker, 2909 Poplar Dr., Sioux Falls
Tennessee	May 14-18	Gatlinburg	K. P. Ezell, 210 23rd Ave., N., Nashville 5
Texas	Apr. 30-May 3	Houston	C. A. McMurray, 3707 Gaston Ave., Dallas 10
Utah	May 18-20	Salt Lake City	R. C. Dalgleish, 1554 Princeton Ave., Salt Lake City
Vermont	June 22-24	Vergennes	E. C. Woods, 128 Merchants Row, Rutland
Virginia	Apr. 30-May 3	Roanoke	M. E. Henderson, Shenandoah Bldg., Roanoke 11
Washington	Mar. 27-29	Seattle	D. R. Shaw, 417 Grosvenor House, 500 Wall St., Seattle 1
West Virginia	July 23-26	White Sulphur Springs	P. H. Loflin, 109 E. Main St., Beckley
Wisconsin	Apr. 24-26	Milwaukee	C. J. Baumann, Jr., 704 W. Wisconsin Ave., Milwaukee
Wyoming	June 15-17	Laramie	T. J. Drew, State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary and Address
Alabama	June 25-30* June 26†	Birmingham	W. L. Smith, 524 Chestnut St., Gadsden
Alaska			J. E. Miller, 1000 Fireweed Lane, Anchorage
Arizona	June 18	Florence	W. G. Biddulph, 1611 N. Second Ave., Glendale
Arkansas	June 18-23*†	Little Rock	G. Cone, 113 S. Pecan St., Osceola
California	Jan. 23-28 June 12-17 June 26-July 1	San Francisco San Francisco Los Angeles	T. R. Flinn, 1021 O St., Rm. A 597, Sacramento 14
Colorado			B. DeRose, Republic Bldg., Denver 2
Connecticut	June 18-20* June 20, 21†	Bridgeport	M. J. Zazzaro, 99 Pratt St., Hartford 3
Delaware			J. F. Maguire 1200 N. Van Buren St., Wilmington
Dist. of Columbia	Jan. 9-13*†	Washington	J. A. Madden, 1740 Massachusetts Ave., N.W., Washington 11
Florida	July 2-12* July 2, 3†	Jacksonville	R. P. Taylor, Jr., P.O. Box 2913, Jacksonville 3
Georgia	May 29-31	Atlanta	H. M. Robertson, 206 Donehoo St., Statesboro
Hawaii	Feb. 9-12‡		F. S. Kagihara, 1644 S. King St., Honolulu
Idaho			W. M. Smith, 305 Fort St., Boise
Illinois			R. I. Humphrey, 185 N. Wabash Ave., Chicago
Indiana	June 6-9*†	Indianapolis	C. A. Frech, Gary National Bank Bldg., Gary
Iowa	June 5-8*†	Iowa City	P. A. Hahn, Farmers & Merchants Bank Bldg., Burlington
Kansas	Jan. 23-25*†‡		R. C. Windscheffel, Medical Arts Bldg., Smith Center

No more x-ray exposures "out the window"

- 90 kvp at 15 ma
- split-second exposures
- electronic timing

General Electric x-ray units now make every shot count!

Rid your examinations of hazards and handicaps imposed by old-fashioned x-ray. *Modernize with General Electric* and you'll guarantee that exposures will be *right every time* — exactly as you dial them — without test shots that waste your valuable x-ray tube! Only General Electric has *electro-stabilization* that automatically regulates x-ray tube performance, not just input voltage.

See both General Electric units now at your dental dealer's showroom — discover firsthand the best in radiography! Or write X-Ray Department, General Electric Co., Milwaukee 1, Wisconsin, for Pub. JJ-13.

Progress Is Our Most Important Product

GENERAL ELECTRIC

State	Date	Place	Secretary and Address
Kentucky	June 12-15*†	Louisville	J. J. Kelly, 102 W. Madison St., Franklin
Louisiana			A. R. deNux, 617 N. Monroe St., Marksville
Maine			A. H. Garcelon, 133 State St., Augusta
Maryland			F. J. Bryce, 303 Granville Dr., Silver Spring
Massachusetts			M. E. Sullivan, 33 State House, Boston
Michigan	Jan. 22-28 June 11-17	Ann Arbor	J. L. Champagne, 3714 W. McNichols Rd. Detroit 21
Minnesota			E. A. Nelson, 2236 Marshall Ave., St. Paul 4W
Mississippi	Jan. 14-16	Jackson	C. V. Pettey, Jr., Box 387, Magnolia
Missouri	June 5-7* June 5† June 12, 13*† June 8-10* June 8† June 12, 13*†	Kansas City Kansas City Kansas City St. Louis St. Louis St. Louis	R. R. Rhoades, Central Trust Bldg., Jefferson City
Montana			E. A. Cogley, Medical Arts Bldg., Great Falls
Nebraska			H. E. Weber, Stuart Bldg., Lincoln
Nevada			R. Whitehead, 40 W. First St., Reno
New Hampshire			L. U. Bergeron, 211 High St., Somersworth
New Jersey	June 1, 2*† June 8, 9*† June 12, 13*† June 19, 20 June 22, 23*†	Philadelphia New York Teaneck Trenton Philadelphia	C. J. Schweikhardt, 150 E. State St., Trenton 8
New Mexico	June 19-24*†‡		G. D. Hastain, Box 1007, Clovis
New York			D. F. Wallace, 23 S. Pearl St., Albany 7
North Carolina			J. H. Guion, Doctors Bldg., Charlotte 7
North Dakota			F. A. Maides, First National Bank Bldg., Grand Forks
Ohio	June 12-14* June 14† June 15, 16*†‡ June 19-21* June 22-24*	Columbus Columbus Columbus Cleveland	D. E. Bowers, 322 E. State St., Columbus 15
Oklahoma			W. H. Stephens, Plaza Court Bldg., Oklahoma City
Oregon			C. Wheeler, Medical Arts Bldg., Portland
Pennsylvania	May 22, 23* June 7† June 7, 8* June 21† June 21, 22*	Pittsburgh Pittsburgh Philadelphia Philadelphia Philadelphia Philadelphia	P. Swanson, 8111 Jenkins Arcade, Pittsburgh
Puerto Rico			J. Mercado C., Comercio St., #452, San Juan
Rhode Island			A. E. Turcone, 298 Broadway, Providence
South Carolina			W. J. Brockington, 1508 Washington St., Columbia 1
South Dakota			H. T. Aker, Canton
Tennessee			C. R. Aita, Bennie-Dillon Bldg., Nashville
Texas			R. T. Weber, Capital National Bank Bldg., Austin 16
Utah			H. R. Nordberg, 143 S. Main St., Salt Lake City 1
Vermont	June 26-28*†	Burlington	B. S. Pinney, 215 Pearl St., Burlington
Virginia	June 12-17* June 14, 15†	Richmond	J. M. Hughes, Medical Arts Bldg., Richmond
Washington			W. B. Lamey, Medical Dental Bldg., Everett
West Virginia	June 19-21* June 20, 21†	Morgantown	A. B. Drake, 1355 Fourth Ave., Huntington
Wisconsin	Jan. 9-11*†	Milwaukee	S. F. Donovan, Tomah
Wyoming			W. J. Ryan, Boyd Bldg., Cheyenne

**Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations. Most states require applications to be in 30 days prior to examination date.*

You Can Do REBASING, And Make REPAIRS, ADDITIONS And SPACE RETAINERS

...*Easier, Better and Faster*

with

®PERM

Multi Purpose Cold-Cure Acrylic

Perm was especially developed to enable you to do permanent rebasing easier, better and faster. This remarkable superfine cold cure material has a smooth, easy working texture that makes it a pleasure to use — with an improved permanent color that closely matches all better denture acrylics.

Perm is equally good for repairs, trays, partials, additions and full dentures, and may be processed by any of the accepted methods. You will experience a new satisfaction the first time you use this time and effort saving material.

NEW COLORFAST LIQUID

Look for the GOLD SEAL on the PERM box. It identifies a new formula that prevents the yellow tinge from appearing in cold-cure dentures.

30-Unit Package
$7.50

another quality product by the manufacturers of
MICROLON
Denture Material

J161

The Hygienic DENTAL MFG. CO.
Akron 10, Ohio

NATIONAL EXAMINATIONS

Name	*Date*	*Place*	*Secretary and Address*
American Board of Dental Public Health	Oct. 12, 13	Philadelphia	D. J. Galagan, Divn. of Dental Public Health, PHS, Dept. of Health, Education and Welfare, Washington, D.C.
American Board of Oral Pathology	Apr. 6	Ann Arbor, Mich.	D. A. Kerr, School of Dentistry, University of Michigan, Ann Arbor, Mich.
American Board of Oral Surgery	Mar. 17-21 Dec. 4	Chicago	L. M. FitzGerald, Roshek Bldg., Dubuque, Iowa
American Board of Orthodontics	Apr. 10-15	Denver	A. W. Moore, University of Washington, School of Dentistry, Seattle 5
American Board of Pedodontics			R. L. Ireland, College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American Board of Periodontology	Apr. 10-12	Indianapolis	B. O. A. Thomas, 668 Homer Ave., Palo Alto, Calif.
American Board of Prosthodontics	Aug. 14-19	Chicago	C. H. Jamieson, David Whitney Bldg., Detroit 26
Council on Dental Education, Dental Aptitude Tests	Jan. 13, 14		S. Peterson, 222 E. Superior St., Chicago 11
National Board of Dental Examiners	Mar. 27, 28 Dec. 4, 5		Grace Parkin, 222 East Superior St., Chicago 11

MEETINGS OF OTHER ORGANIZATIONS

Name	*Date*	*Place*	*Secretary or Chairman and Address*
Academy of Dentistry for the Handicapped	Feb. 5	Chicago	R. L. Holle, 3501 Cornell Pl., Cincinnati 20
Academy of Denture Prosthetics	May 7-12	Minneapolis	W. L. Warburton, Medical Arts Bldg., Salt Lake City 11
Academy of General Dentistry	Feb. 7	Chicago	A. L. Knab, 8500 Stony Island Ave., Chicago
Academy of Oral Dynamics	Mar. 11, 12	Washington, D.C.	J. T. McSweeney, 140 E. 80th St., New York 21
American Academy of Crown and Bridge Prosthodontics	Feb. 4, 5	Chicago	W. E. Corry, 2165 Adelbert Rd., Cleveland 6
American Academy of Dental Practice Administration	Feb. 2-4	Chicago	R. H. Campbell, 18595 Grand River Ave., Detroit 23
American Academy of Oral Pathology	Apr. 6-8	Ann Arbor, Mich.	R. J. Gorlin, School of Dentistry, University of Minnesota, Minneapolis
American Academy of Physiologic Dentistry	June 13-14	Duluth, Minn.	E. A. Lawton, 2217 Lincoln Way West, South Bend, Ind.
American Academy of Restorative Dentistry	Feb. 4, 5	Chicago	M. H. Mortonson, Jr., 735 N. Water St., Milwaukee 2
American Association of Dental Schools	Mar. 26-29	Boston	R. Sullens, 840 N. Lake Shore Dr., Chicago 11
American Association of Endodontists	Feb. 2-5	Chicago	E. C. Van Valey, 9 Rockefeller Plaza, New York 20
American Association of Industrial Dentists	Apr.	Los Angeles	E. R. Aston, Pennsylvania Dept. of Health, P.O. Box 90, Harrisburg
American Association of Orthodontists	Apr. 16-21	Denver	E. E. Shepard, 225 S. Meramec Ave., St. Louis 5
American Dental Society of Europe	June 27-30	Paris, France	J. P. Molony, 110 Harley St., London W.1, England
American Equilibration Society	Feb. 2	Chicago	R. C. Van Dam, 11431 S. Halsted St., Chicago 28
American Hypnodontic Society	June 18	New York	R. M. Ferber, 140 E. 56th St., New York
American Society for the Advancement of General Anesthesia in Dentistry	Mar. 27	New York	M. H. Feldman, 730 Fifth Ave., New York 19

Gly-Oxide®

Pre and post surgically, Gly-Oxide helps keep the involved area free of debris and minimizes bacterial growth (1)

New Packaging adopted Sept. 1960.

ANTIBACTERIAL:

Comparative laboratory studies demonstrate that Gly-Oxide retains antibacterial action even in the presence of blood.[1]

CLEANSING:

"There is a special debriding and detergent action of this product which is especially valuable in topical therapy."[2]

ADHERENCE:

Used undiluted, as directed, "The adherence of the product to the gingival tissue . . . (is) of special interest."[3]

STABILITY:

The antibacterial and cleansing action of Gly-Oxide is sustained through the prolonged release of oxygen.[1]

CONVENIENCE:

When prescribed for adjunctive home therapy, the ease of application from the plastic squeeze bottle and the pleasant flavor assures patient acceptance.

References:

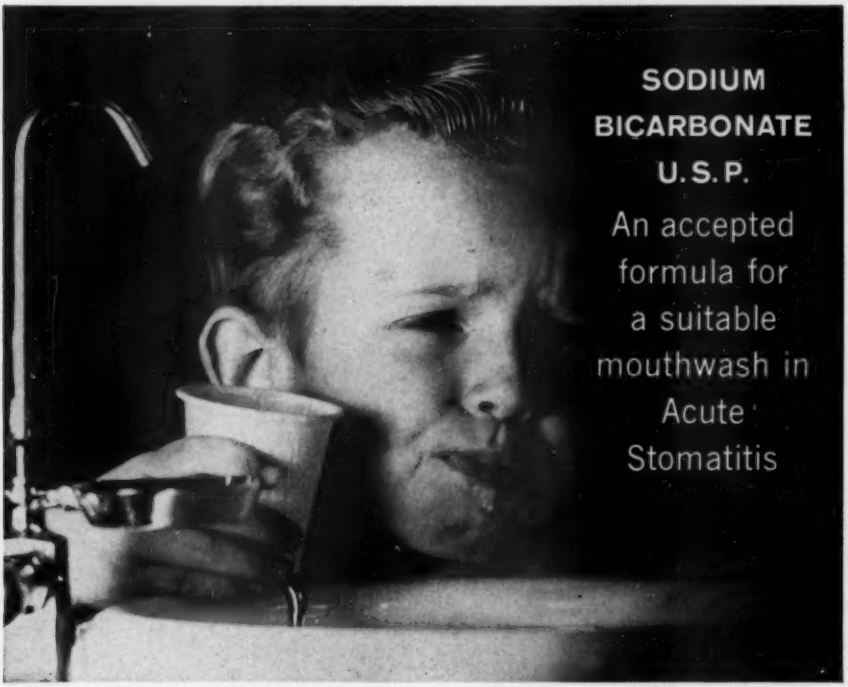
1. Cobe, H. M., Oral Surg., Oral Med., Oral Path., Vol. 13, No. 6, (June, 1960), pp. 678-685.
2. Harkins, H. P., The Eye, Ear, Nose & Throat Monthly, Vol. 38, (Nov., 1959), pp. 942-944.
3. Cobe, H. M., Cohen, D. Walter, Hattler, A. B., Pa. Dent. Jrl., Vol. 24, (Jan., 1959), pp. 12-18.

INTERNATIONAL PHARMACEUTICAL CORPORATION

1700 WALNUT STREET **PHILADELPHIA 3, PA.**

Name	*Date*	*Place*	*Secretary or Chairman and Address*
American Society of Geriatric Dentistry	Feb. 4	Chicago	P. G. Rubens, 55 E. Washington St., Chicago 2
Berkshire Conference in Oral Pathology and Periodontology (Twelfth)	June 18-22	Lenox, Mass.	I. Glickman, Tufts University School of Dental Medicine, 136 Harrison Ave., Boston 11
British Dental Association	June 18-23	Harrogate, U.K.	J. Peacock, 13 Hill St., Berkeley Sq., London W.1, England
Canadian Dental Association and Western Canada Dental Society	June 4-7	Saskatoon	N. F. Gropper, Canada Bldg., Saskatoon, Sask., Canada
Central Dental Association	Feb. 19-22	Aspen, Colo.	D. I. Muirhead, Hastings, Minn.
Chicago Dental Society	Feb. 5-8	Chicago	K. S. Richardson, 30 N. Michigan Ave., Chicago
Denver Dental Association	Jan. 8-11	Denver	G. L. Ogle, Republic Bldg., Denver 2
Fédération Dentaire Internationale, 49th Annual Session	July 9-15	Helsinki, Finland	G. H. Leatherman, 35 Devonshire Pl., London W.1, England
Greater Philadelphia Annual Meeting	Mar. 21-24	Philadelphia	M. Kohn, Sheraton Hotel, 17th St. & Pennsylvania Blvd., Philadelphia 3
International Association for Dental Research	Mar. 23-26	Boston	D. Y. Burrill, 311 E. Chicago Ave., Chicago 11
Mid-West Society of Periodontology	Feb. 4	Chicago	L. Howlett, Jr., Medical Arts Bldg., Springfield, Mo.
Northwest Academy of Dental Medicine (Seventeenth Annual Conference)	May 25-28	Gearhart, Ore.	G. Underwood, Selling Bldg., Portland 5, Ore.
Philippine Dental Association	May 10-14	Baguio City	L. C. Macapanpan, Philippine Dental Association, P.O. Box 1142, Manila
Southeastern Academy of Prosthodontics	May 18-21	Bal Harbor, Miami Beach, Fla.	J. H. Allgood, 516 Military Rd., Columbus, Miss.
Southern Academy of Oral Surgery	Mar. 11, 12	Atlanta, Ga.	H. E. Loving, Central Building, Mahoney Wing, Bristol, Tenn.
Spanish Society of Orthodontics (Seventh)	Apr. 27-30	Valencia	A. J. Cervera, Avda. Oeste, 29, Valencia, Spain
Swiss Dental Society, Seventy-fifth Anniversary	June 1-4	Basle	B. Jakubowitsch, Blumenrain 20, Basle, Switzerland
Thomas P. Hinman Dental Meeting	Mar. 26-29	Atlanta, Ga.	A. E. Anderson, 1387 Oxford Rd., N.E., Atlanta 7

Stomatitis



After painful instrumentation or in acute inflammatory conditions such as stomatitis, Sodium Bicarbonate U.S.P. in a two per cent solution makes a well-tolerated mouthwash.[1]

1. Accepted Dental Remedies, pp. 135 & 143, 25th Edition, 1960.

Arm & Hammer Baking Soda is accepted by the American Dental Association as Sodium Bicarbonate U.S.P. It may be prescribed with confidence wherever Bicarbonate of Soda is indicated.

CHURCH & DWIGHT CO., INC., 70 PINE STREET, NEW YORK 5, N.Y.

Dental Materials
Pathology
Hypnotic Methods

Saunders books

Saunders books

Skinner & Phillips' — *New (5th) Edition*

SCIENCE OF DENTAL MATERIALS

How to select and use today's modern dental materials. **Here is the new (5th) edition of a reliable guide to new dental materials as well as improved procedures for using long established materials. The book covers plastics, dental stone, non-metallic tooth restorative material, metallography, dental amalgam, inlay casting, gold alloy wires and solder — showing how each responds to stresses and strains. New chapters cover rubber impression materials, corrosion, burs and hand pieces. Clinical application of basic properties is stressed with analyses of failure and mismanipulation. Among the practical problems discussed are causes of amalgam failure, leakage around restorative material, and merits of cavity varnishes.**

By EUGENE W. SKINNER, Ph.D., Professor of Physics, Northwestern University Dental School; and RALPH W. PHILLIPS, M.S., Professor of Dental Materials, Indiana University School of Dentistry. 636 pages, 6½" x 9¼", illustrated. $9.50.
New (5th) Edition — Published August, 1960.

Manhold & Bolden's — *New!*

OUTLINE OF PATHOLOGY

The mechanisms of disease stripped down to their clinical essence. **This handy new manual contains brief, pertinent descriptions of both general and systemic pathologic processes. Regressive changes, circulatory changes, inflammation and repair, deficiency diseases and disturbances of growth are fully covered. For each organ or region, pathologic changes are outlined — what they look like, what probably caused them, what results may be expected, etc.**

By JOHN H. MANHOLD, JR., D.M.D., M.A., F.A.C.D., Professor of Pathology and Oral Diagnosis for the College of Dentistry, Seton Hall College of Medicine and Dentistry; and THEODORE E. BOLDEN, D.D.S., M.S., Ph.D., Assistant Professor of Oral Diagnosis and Pathology, Seton Hall College of Medicine and Dentistry. 340 pages, 4⅝" x 7¾". $4.75.
New — Published September, 1960

Meares' — *New!*

A SYSTEM OF MEDICAL HYPNOSIS

A complete description of the techniques of hypnosis in practice. **Here is a unique new book that will guide any physician or dentist in the safe, effective use of hypnosis, considering its advantages and limitations. Dr. Meares shows you how to establish pre-hypnotic rapport with your patient; how to choose the proper method to be used (relaxation, arm levitation, repetitive movement, direct stare or the dynamic method) according to the patient's personality; how to induce the hypnotic state. You'll find effective methods of waking patients; how to avoid complications; how to recognize personalities not amenable to hypnosis. You'll learn how to use hypnosis for the relief of pain; how to use posthypnotic suggestion; how to prolong the hypnotic sleep.**

By AINSLIE MEARES, M.D., D.M.P., Melbourne, Australia. President, International Society for Clinical and Experimental Hypnosis. 484 pages, 6" x 9¼". $10.00.
New — Published October, 1960

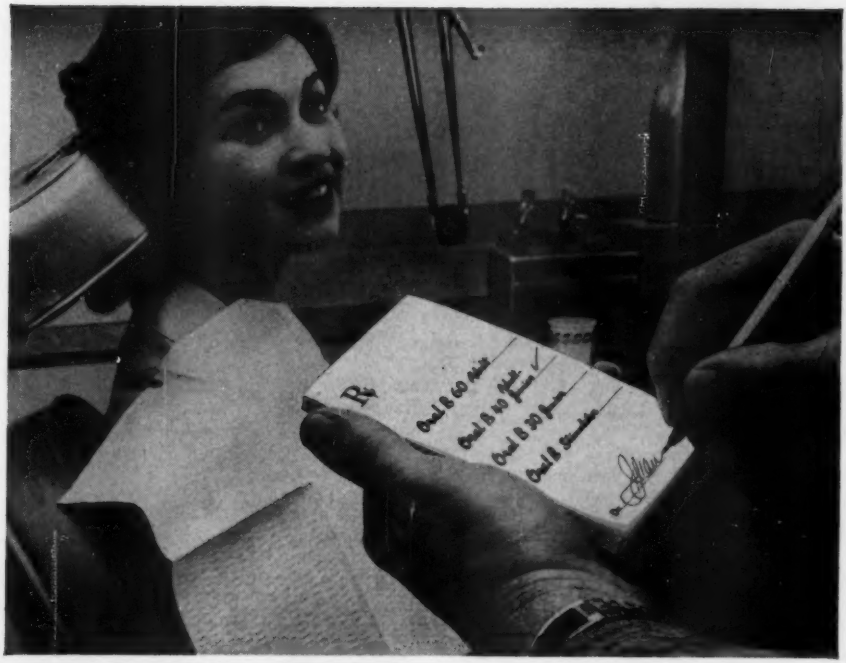
ADA 1-61

W. B. SAUNDERS COMPANY, West Washington Square, Philadelphia 5
Send for 30-day examination and charge:

- ☐ Skinner & Phillips — Dental Materials — $9.50
- ☐ Meares — Medical Hypnosis — $10.00
- ☐ Manhold & Bolden — Pathology — $4.75

Name.....

Address.....**Zone**.....**State**.....



The 2nd best* thing you can do for your patient's teeth...

***FIRST,** of course, is the important schedule of periodic visits to your office for an examination.

***SECOND,** is your recommendation for regular home dental care with an ORAL B. Prescribe the brush that helps protect *gums* as well as teeth.

This different brush brings important professional care into the home. More than 2,500† very small and flexible filaments encourage gentle care at the gum line, where tooth troubles often start. The smooth-top design provides thorough cleansing of tooth structure plus gentle brushing of gingival tissues without injury.

Prescribe an ORAL B . . . the original multi-tufted brush. It does what a toothbrush ought to do! †ORAL B 60

1 texture . . . Firm enough for teeth, gentle enough for gums.

2 actions . . . Gentle brushing and thorough cleansing.

3 sizes . . . For every member of the family.

Write for your professional sample.

ORAL B COMPANY
San Jose, California • Toronto, Canada

NEW... **TWO-SIDED SNAP-OUT MIRROR**

the revolutionary

SURGIDENT **MOUTH MIRROR**

SAVES TIME— Now in seconds—snap out used mirror—turn over—snap in other side!

SAVES YOUR EYES— Both sides are "first surface" mirrors for greater clarity without "ghosts" or distortion.

SAVES MONEY— You get two mirrors for less than the cost of one conventional mirror.

SEE YOUR DENTAL DEALER

Surgident LTD. LOS ANGELES 66, CALIFORNIA

Manufacturers of Quality Products for the Dental Profession

ELECTRO-MALLET

The electronic foil condenser

COMPACT

Operates on the new principle of high frequency malleting at reduced intensity without sacrifice of foil density. Recognized as superior by leading dental schools and nationally known foil operators.

The **Electro-Mallet** is equally advantageous for condensing **amalgam.**

A 30-day trial without obligation to purchase is available. Please write for details.

McShirley Products 6535 San Fernando Glendale 1, Calif.

NOW . . . FOR PARALLAX-FREE DENTAL PHOTOGRAPHY

Displacement of permanent lower lateral incisors due to over-retention of deciduous laterals. Taken with the Automatic Exakta.

AUTOMATIC EXAKTA VX-IIa

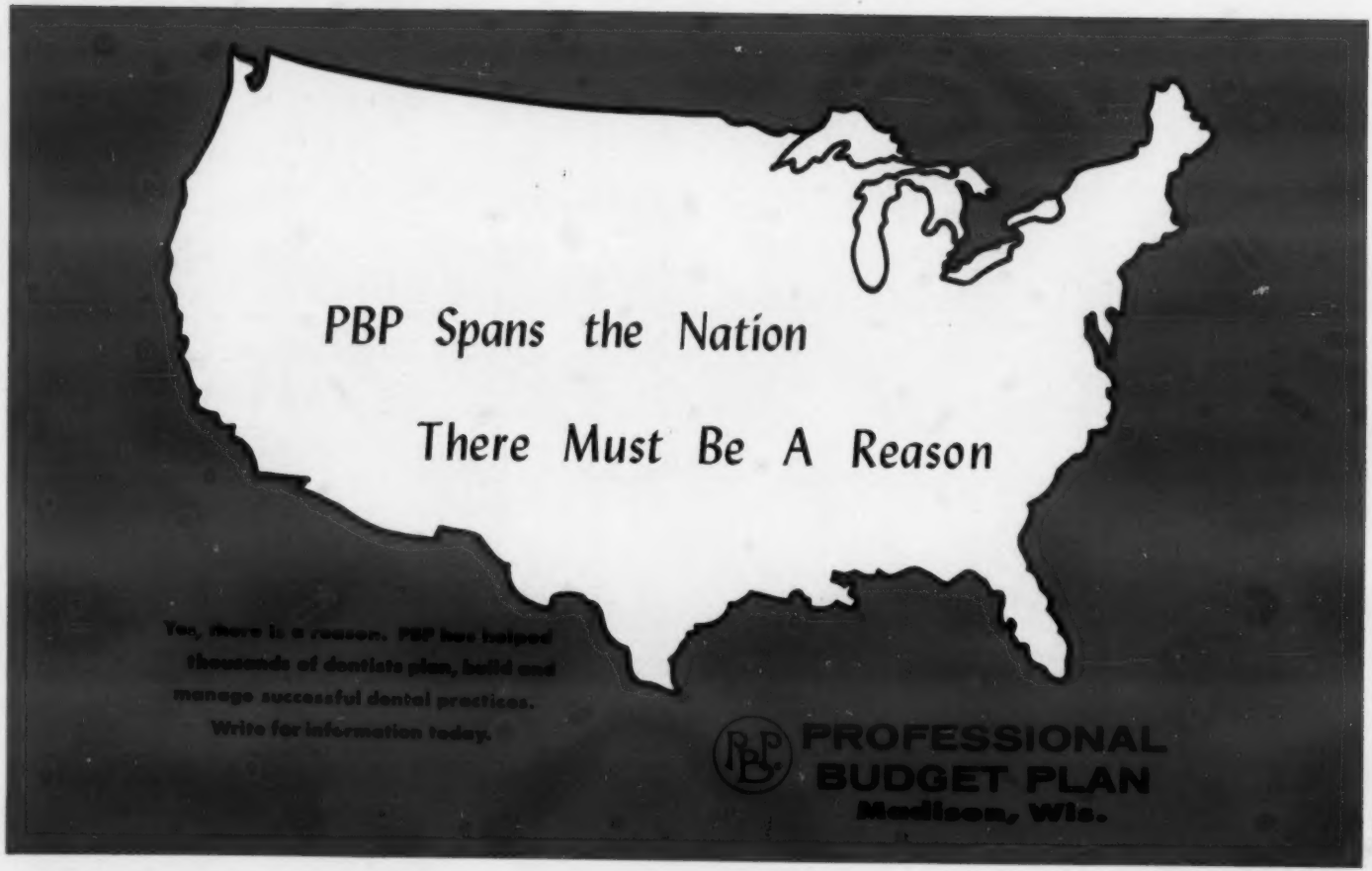
35-MM. SINGLE LENS REFLEX CAMERA WITH f/2.0 AUTOMATIC ZEISS BIOTAR LENS

For easily made dental photographs and faithfully reproduced oral conditions—facilitating case recording in oral pathology, surgery, orthodontics and full mouth rehabilitation . . . an invaluable aid in patient education. New AUTOMATIC Lens, when fully stopped down, permits focusing and viewing without annoying the patient with modeling lights. In addition, you can use the Exakta for personal photography, sports, portraits, copywork, etc. Priced from $279.50

FREE! — Write Dept. 209 for Free Descriptive Booklet "B" on Camera & Accessories and Brochure on Close-Up Technique with Automatic Exakta VX-IIa.

EXAKTA CAMERA COMPANY

700 Bronx River Road, Bronxville, New York


PBP Spans the Nation
There Must Be A Reason
Yes, there is a reason. PBP has helped thousands of dentists plan, build and manage successful dental practices. Write for information today.
PBP
PROFESSIONAL BUDGET PLAN
Madison, Wis.

THE BOOK YOU'LL NEED THIS YEAR

1961 Accepted Dental Remedies

For over 25 years, *Accepted Dental Remedies* has been "the last word" in dental therapeutics in thousands of dental offices. This year more than ever, ADR belongs within easy reach on your desk for it contains a wealth of important material to help you render a better dental service as well as conserve time and money in your practice.

Fluorides. Completely revised for '61, ADR contains an expanded new chapter on stannous fluoride dentifrices, topical applications and other aspects of this important subject.

New Drugs. ADR includes information on three new local anesthetics, plus revised and updated chapters on such helpful subjects as the handling of office emergencies, dental treatment of patients receiving medical care, writing prescriptions.

List of accepted brands. As usual, ADR for '61 contains a current listing of accepted drugs that have met the exacting standards of the ADA Council on Dental Therapeutics.

Order your 1961 *Accepted Dental Remedies* today. Only $3 per copy.

American Dental Association
Order Department
222 East Superior Street
Chicago 11, Illinois

Please send me ___ copies of the 1961 *Accepted Dental Remedies* at $3 per copy. My remittance is enclosed.

Name_____

Address_____

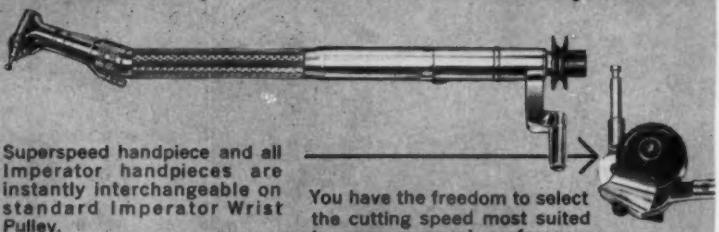
City_____ Zone____ State_____

578

THE SUPERSPEED
miniature head FG HANDPIECE

Designed for the quick removal of bulk tooth structure for individual preparations or full mouth rehabilitation. Produces speed to 150,000 r.p.m.
Precision built to extremely close tolerances.
Comfortable to handle
Light weight
Well balanced
Convenient contra angle shape
The Miniature Head FG Superspeed uses standard FG cutting instruments. Its shorter, smaller diameter head provides greater maneuverability in the mouth, better visibility and easier access to posterior preparations.

Perfect Companion to the Fabulous Imperator



Superspeed handpiece and all Imperator handpieces are instantly interchangeable on standard Imperator Wrist Pulley.

Change from one to another as requirements indicate with complete ease.

You have the freedom to select the cutting speed most suited to your personal preference. Only the Imperator and the Kerr Superspeed miniature head FG Handpiece offer you this versatility.

KERR

THE SUPERSPEED
miniature head FG HANDPIECE

KERR MANUFACTURING COMPANY Detroit 8, Michigan

Specify Regular or Fast Setting.

Available in 1 lb. cans (as shown). Also in 10 lbs. 50 lbs. and 100 lbs.

SUPERGEL, the **perfected** alginate impression material, is the result of years of experience. Superblended to provide a creamy consistency when mixed, its chemical characteristics include a fast water absorption with desirable wetting action and lower surface tension. It has **body** with **flow.** Its elasticity and toughness assure impressions with minute detail. Complete patient acceptance because it has a pleasant flavor and fragrance. No fix, no fuss, no muss — but a thoroughly satisfactory impression to patient, dentist and technician.

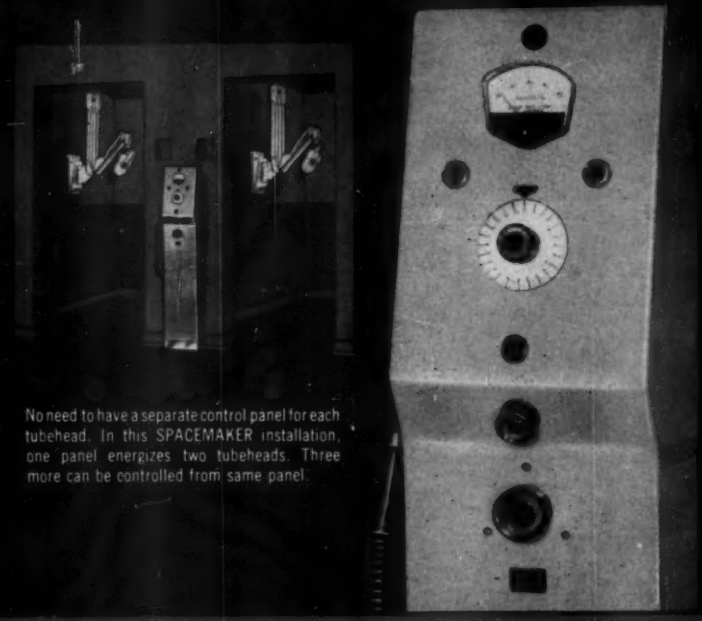
Order thru dealer

HARRY J. BOSWORTH COMPANY

Creative Products for Modern Dentistry

Just ONE control panel
for up to 5 tubeheads

XRM *Spacemaker* 90P



No need to have a separate control panel for each tubehead. In this SPACEMAKER installation, one panel energizes two tubeheads. Three more can be controlled from same panel.

Panel controls efficiently grouped. Those for viewing are on the tilted upper panel; adjustment controls are waist high. Safe speedy radiography is assured by these features of XRM Spacemaker 90P: No trial exposures. 10 or 15 MA pre-selected and stabilized. Electronically accurate impulse timer for perfect exposures 1/60, 1/30, 1/20 . . . up to 5 seconds. Offset yoke and new arm for easy maneuvering, accurate positioning. Tube and transformer completely oil-immersed for shockproof operation. Rayproofing meets Federal requirements. Filter 2.0MM. Ask your dealer about the XRM Spacemaker, or write to us.

XRM X-RAY MFG. CORP. OF AMERICA
LAKE SUCCESS PARK
COMMUNITY DRIVE, GREAT NECK, N.Y.
Subsidiary of The S. S. White Dental Manufacturing Company

Attention Dentists in

Arkansas

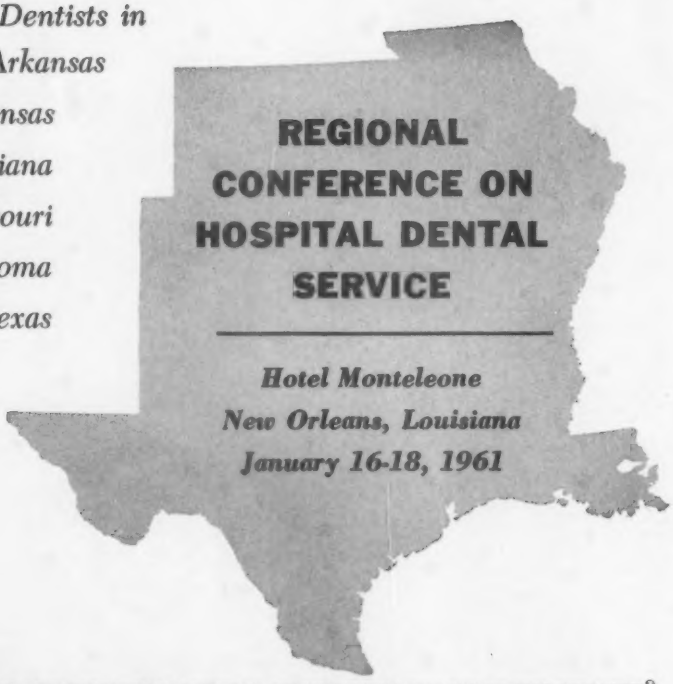
Kansas

Louisiana

Missouri

Oklahoma

Texas



WHY ARE HOSPITAL DENTAL SERVICE PROGRAMS SO IMPORTANT?

Today the hospital is the community center for health services. Dentistry must be represented in this community center. The dentist must take the initiative to promote and facilitate the proper development of dental services in hospitals.

This Regional Conference will bring to the constituent and component societies, the committees on hospital dental service and other interested health agencies, a program for establishing dental services in hospitals. The conference will offer a step-by-step plan for developing active dental service programs for hospitals. Plan to participate now! No registration fee is required.

conducted by
Council on Hospital Dental Service
American Dental Association

Louisiana Dental Association
host society

Council on Hospital Dental Service
American Dental Association
222 East Superior Street
Chicago 11, Illinois

Please send me the preliminary program and available information on the Regional Conference on Hospital Dental Service.

Name_____

Address_____

City_____ Zone____ State_____

14,541,682
ENRICHED . . .
and whole wheat flour foods are listed among the "Essential Four" food groups set up by the U.S. Dept. of Agriculture's Institute of Home Economics. Diet selected from these foods provides ample protein, vitamins and minerals.
TIMES

As a professional interested in the relation of good diet to good health, you may have seen and read the message in the "slice of bread" emblem illustrated above. It has now appeared 14,541,682 times in publications addressed to physicians, dentists, dietitians, public health workers and to food-oriented laymen.

To what end? Just this: The emblem tells our whole story over and over again . . . and tells it in the words of the Bureau of Human Nutrition of the U.S. Department of Agriculture. The USDA says that products of wheat—enriched, whole grain and restored—are among the four recommended groups of food.

You may conclude that flour foods are popular foods, good for you . . . good for everybody. They are not more fattening than most other foods, and are less fattening than many. At low cost they provide a generous portion of nutrients required in everyday diet. Easily digested—enriched wheat products make a valuable contribution in B-vitamins, food iron, proteins and usually calcium to most diets—whether planned for therapy, weight reduction or normal feeding.

With the "slice of bread" emblem, we have also offered a number of materials for professional review and possible distribution. These have all been accepted for advertising in the Journal of the American Medical Association. Several have also been reviewed by the A.M.A. Council on Foods and Nutrition and have been found consistent with current, authoritative medical opinion.

This material is successful only as it serves you. It is offered at no charge. If you are interested in copies for review send coupon below.

WHEAT FLOUR INSTITUTE

309 W. Jackson Blvd. · Chicago 6, Illinois

To: Wheat Flour Institute • 309 W. Jackson Blvd. • Chicago 6, Ill. Dept. ADLA-1

Please send me for my professional review the materials checked below:

- ☐ **"Snack Foods"** leaflet—basic facts about snacks and foods, meal planning, calorie control, causes of tooth decay.
- ☐ **"Classroom Food Facts and Fun"**—a guide to help teach "Food for Health," with specific suggestions for different grade levels.
- ☐ **"Make-A-Meal Book"**—over 100 line drawings of food, ready for coloring by pupils, to teach values of everyday foods.
- ☐ **"Shield of Good Health"**—Wall chart, 17" x 22", Notebook chart, 8½" x 11". A full-color presentation of the U. S. Department of Agriculture's "essential four" food groups.
- ☐ **"Role of Wheat and Wheat Products in Human Nutrition"**—an authoritative survey of literature.
- ☐ **"From Wheat to Flour"**—A basic reference, revised edition.
- ☐ **"Weight Control . . . The Module Way"**—a new weight control concept.
- ☐ **"Prevention of Obesity"**—Symposium reprint, from the Bulletin of the New York Academy of Medicine.
- ☐ **"Eat to Live"**—fact book on nutrition—revised edition.
- ☐ **"Eat and Grow Slim"**—an "AMA-reviewed," easy-to-follow reducing diet, using popular, readily-available everyday foods.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

(offer limited to United States and Possessions)

Aristaloy

DENTISTRY'S FINEST FILLING MATERIAL

There is still only one Aristaloy for all types of amalgam restorations • Aristaloy contains a very small but very beneficial zinc content of only 0.4 percent • Our exclusive manufacturing process and Aristaloy's easy trituration and condensing properties give it a balance which has come close to perfecting amalgam restorations • Aristaloy has never been even closely imitated. It costs no more than other alloys and is presented to the profession only on a quality basis • Ask your dealer for a Dispenser Combination Package.

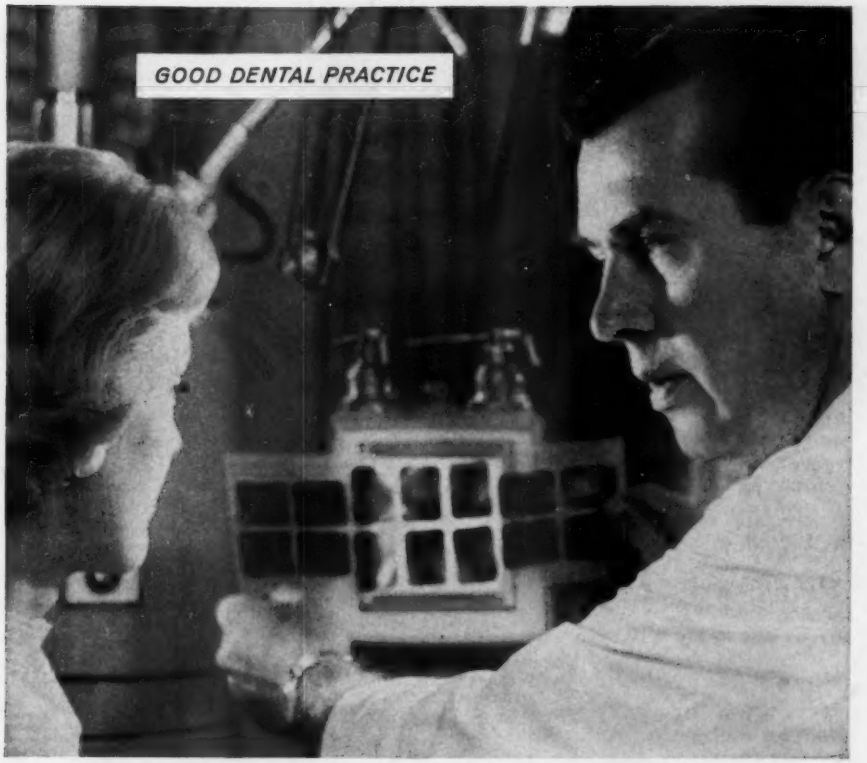
ENGELHARD INDUSTRIES, INC.

BAKER DENTAL DIVISION

850 PASSAIC AVENUE • EAST NEWARK, N.J.

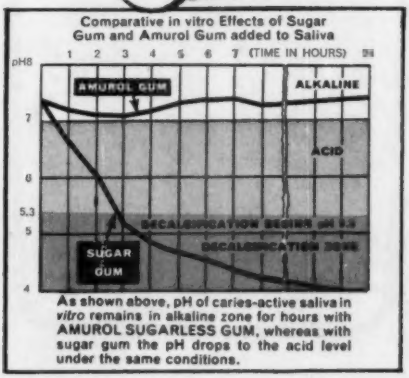
BAKER

A TRADE MARK OF QUALITY



The first step in caries reduction...

Amurol®



As shown above, pH of caries-active saliva in *vitro* remains in alkaline zone for hours with AMUROL SUGARLESS GUM, whereas with sugar gum the pH drops to the acid level under the same conditions.

SUGARLESS "SWEETS"

WHEN you advise your caries-active patients to reduce sugar intake, their desire for "something sweet" often makes your professional recommendation difficult to follow.

In such cases your patients will find that Amurol Sugarless Gum and Mints satisfy the "sweet tooth" without promoting caries. They are delicious, refreshing, yet free from sugar. Sold everywhere in a variety of flavors.

Amurol samples and patient literature are available upon request.

AMUROL PRODUCTS CO. NAPERVILLE, ILLINOIS

LEA & FEBIGER BOOKS

Dental Roentgenology

By LeROY M. ENNIS, D.D.S.

Chairman of the Department and Professor of Roentgenology, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania

and HARRISON M. BERRY, JR., D.D.S.

Professor of Roentgenology, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania

5th Edition. "This book is one of the most dependable guides available for perfecting technic in the exposure, development and interpretation of roentgen films. A welcome addition to every dental library."—*Journal of Dental Medicine.*

5th Edition. 607 Pages.
1801 Illus. on 1282 Figures. $15.00

Practical Oral Surgery

By HENRY B. CLARK, JR., M.D., D.D.S.

Chairman, Division of Oral Surgery, School of Dentistry, University of Minnesota

2nd Edition. This graduated course of study in oral surgery meets the needs of schools with limited curricula time. It is sufficiently comprehensive to serve as a handbook of what the dentist in general practice should know about oral surgery. "Every dentist should include Practical Oral Surgery in his library."—*Illinois Dental Journal.*

2nd Edition. 469 Pages.
509 Illus. on 279 Figs. $9.50

Mail Coupon Today

LEA & FEBIGER WASHINGTON SQUARE PHILADELPHIA 6, PA.

Please send me books listed in margin below:

☐ Check enclosed

Bill me at ☐ 30, ☐ 60, ☐ 90 days

☐ Charge on your monthly partial payment plan

(We pay postage if remittance in full accompanies your order)

NAME (print)_____

ADDRESS_____

CITY_____ ZONE___ STATE_____

JI, ADA 1-61

You can say it with words or you can say it with pictures, but it's best to say it with . . .

COLUMBIA DENTOFORMS

If you do not have our Catalog #33, write for your copy today.

COLUMBIA DENTOFORM CORP.

"The House of A Thousand Models" and Home of Brown Precision Attachments

131 E. 23rd St. • New York 10, N.Y.

$1,000 to $5,000

Personal Loans to Professional Men

Strictly Confidential

A nationwide Executive Loan Service designed for responsible professional men as a convenient supplementary source of personal credit. No collateral, no endorsement, no embarrassing investigation. All details handled by mail from the privacy of your office. Monthly repayments up to 2 years if desired. References:

Chase Manhattan Bank of New York
First National Bank of St. Paul
Crocker-Anglo National Bank of San Francisco

For full particulars write
MR. A. J. BRUDER, *Vice Pres.*

Industrial Credit Company

St. Paul 2, Minnesota

Introducing the new

SIEMENS

Sirona

»D«

dental

unit

With new extra large instrument table optimally positioned for all operating procedures . . . housing all needed equipment including built-in air turbine, air and water syringe, cold and warm air syringe, electric cautery, plus three swivel drawers for essential materials and accessories.

Ask your dealer about this new unit and write us for full color literature.

SIEMENS-NEW YORK, Incorporated

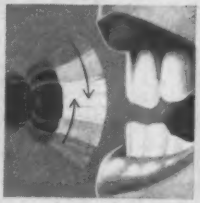
Dental Division,
10-39 44th Dr., Long Island City 1, N.Y.

In Canada: Consolidated X-Ray Supplies Co., Ltd.
and its dealers
4943 Sherbrooke Street West, Montreal 6
Tel. Nos: HU 8-9161 and HU 8-9162

Siemens Equipment on Display at the Mid-winter Meeting, Chicago, Ill.

Makes it easier for your patients

Here is an entirely new approach to dental hygiene for the whole family... a major advance in dental brush performance.



to practice what you preach

NEW BROXODENT®

SQUIBB AUTOMATIC ACTION BRUSH FOR TEETH AND GUMS

For gentle, controlled brushing of the gingiva.
For safe, effective, thorough cleaning of teeth.

BROXODENT brings your patients three essential benefits:

TECHNIQUE – Many patients "just don't" follow your instructions on vertical brushing. The *Broxodent* brush oscillates in a 60° arc, gently brushing the gingiva and removing food particles.

ELBOW-GREASE – Many patients are "too lazy" to make the necessary effort. Comfortable, convenient *Broxodent* does the work easily, requiring only a minimum of guidance.

TIME – Many patients, also, are "too busy" to spend twice a day the necessary four or five minutes you recommend for the maintenance of sound oral health. *Broxodent* provides in 45 seconds the required efficacy of gingiva brushing and debris removal.

THE SAFE, SILENT MOTOR UNIT – Fully approved by the Underwriters Laboratories – the motor unit is self-lubricating and sealed in a watertight, shockproof housing. Easily operated by all members of the family, even children, wherever 110 volt alternating current is available.

INTERCHANGEABLE BRUSH UNITS – Each member of the family has his own brush, soft enough to protect gingival tissues and tooth enamel – shaped to reach every dental surface.

Unconditionally guaranteed for one full year, Broxodent *is available with two interchangeable brushes, a plastic travel case, and a convenient bathroom wall rack, at the better pharmacies, for $19.75. Extra brushes (in a variety of colors) can be purchased separately, two for $.98.*

SPECIAL INTRODUCTORY OFFER TO DENTISTS!

Broxodent is available *to dentists only* at a special professional price of $14.85. *Write now* to E. R. Squibb & Sons, 745 Fifth Avenue, New York 22, N.Y., for immediate delivery.

SQUIBB *Squibb Quality—the Priceless Ingredient*

"BROXODENT" IS A TRADEMARK

NOW, MORE THAN EVER
YOUR HELP IS NEEDED

give

TO THE 1960 ADA RELIEF FUND

Rising costs and a growing number of Relief Fund grants mean that your help is needed as never before. The 1960 goal is $125,000. Help your colleagues in distress. Send your contribution today to American Dental Association Relief Fund, 222 East Superior Street, Chicago 11, Illinois.

Ritter HELPS KEEP YOUR BUSIEST DAYS ON SCHEDULE!

YOU KEEP COOL, SEE BETTER WITH THE Castle AcuVision *DENTAL LIGHT*

Exclusive transtherm cooling directs the infra-red heatwaves *away* from you and your patients. You stay fresh and cool . . . in efficient command of your skills . . . all day long. Virtually shadow-free light, in daylight color, fills the oral cavity in a panoramic pattern from 28 different optical elements.

YOU SAVE TIME, FREE YOUR HYGIENIST FOR OTHER WORK WITH THE Castle 777 SPEEDCLAVE

Just load it, close the door, set the dial —that's all there is to it! SpeedClave races through its automatic sterilization cycle in just 10 minutes from a warm start. It's easy to carry, compact as a typewriter, saving you valuable space, and so low in purchase and operating cost. You save every way!

SEE them both at your Ritter/Castle dealer's, or WRITE to Ritter Company Inc., 3401 Ritter Park, Rochester 3, N. Y.

**Trademark of Ritter Company Inc.*

Ritter Company Inc.

RITTER PARK • ROCHESTER 3, NEW YORK

Sets with a snap . . . pronto!

Bonfil

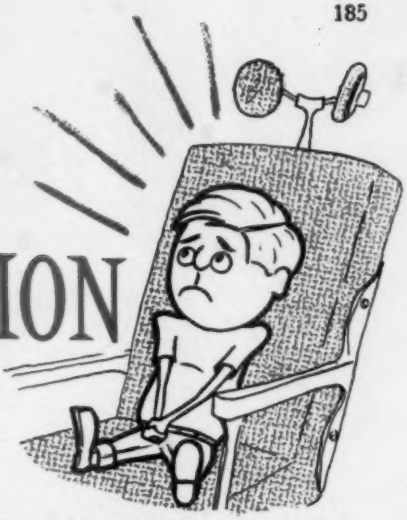
Almost as fast as the crack of a whip, Bonfil's *snap set* is prompt and positive. And the filling can be finished only five minutes after it is placed!

In addition, Bonfil adapts tightly to cavity surfaces, overcoming certain clinical disadvantages previously associated with resin filling materials. It can be placed by brush or by the flow technic. Completely compatible with the tooth, it matches enamel in appearance, remains colorfast.

For modern materials call on

CAULK

Milford, Delaware

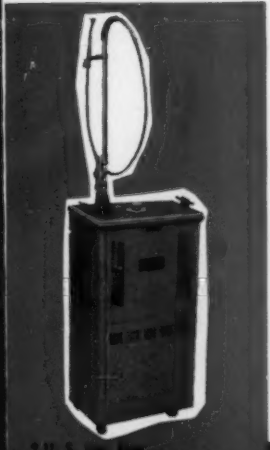


NO MORE APPREHENSION

with **Turbo-Jet** the preferred *"all 'round" high speed handpiece for the* up-to-date dental operatory.

WHY? . . . the low noise factor and, vibration free design introduces to patients the surprisingly gentle experience of **TURBO-JET's** tranquil action eliminating apprehension from all future visits.

Dentists the world over have confirmed each others praises of **TURBO-JET** proving this established high speed handpiece to be one of the most versatile and preferred in the field of **PEDODONTICS.**



* U. S. Pats. Nos. 2,799,944; 2,871,582; 2,898,710

SEE the new **SPEED CONTROL** which permits the use of carbides at reduced speed for the efficient removal of caries without burnishing.

TEST its **COMPLETE TACTILE CONTROL** making possible for the first time in a high speed handpiece the use of complete instrumentation from the smallest carbide to the largest diamond disc or wheel.

EXAMINE the new **FLEXIBLE UPRIGHT** which allows full 360° rotation . . . and is adjustable to any angle.

INVESTIGATE the many other desirable features which are yours with todays new, improved **TURBO-JET.**

SEE FOR YOURSELF WHY

- Dentists admire it
- Children desire it
- You'll require it

OVER ALL OTHER HANDPIECES as the most important part of your "all 'round" operatory equipment!

Introduce yourself to the new, quiet, **VIBRATION FREE WORLD OF TURBO-JET.**

Fill in and mail the attached coupon today for your free literature "The Inside Story of High Speed."

BOWEN & COMPANY, Inc.

P. O. Box 5818, Bethesda 14, Md.

Please send me without obligation your FREE Booklet.

Dr. .....

Address .....

City ..... Zone ..... State .....

KEEP THEM GERM-FREE

with

Getz GERMICIDE CONCENTRATE

safe, sure, economical

Getz GERMICIDE CONCENTRATE is recognized as a suitable storage medium for burs, diamonds and small instruments, without danger of corrosion, dulling or other harmful effects.

Accepted
COUNCIL ON DENTAL THERAPEUTICS
AMERICAN DENTAL ASSOCIATION

New Quart Size For Maximum Economy

$12.50 at dental dealers.

Makes 15 gallons of superior disinfectant.

W G The William Getz Corporation

7512 SOUTH GREENWOOD AVENUE • CHICAGO 19, ILLINOIS

DRILLING SPATTER DOESN'T MATTER
WHEN YOU PROTECT YOUR PATIENTS
WITH **ZOBEC**

ABSORBENT DENTAL NECKBANDS

ZOBEC is a 4" width of cotton-filmated gauze designed for greater elegance in today's high-speed techniques. This soft, highly absorbent material keeps water and debris from the patient's clothing...protects areas not covered by towel or apron. Desired length can be cut from roll and folded to fit any area. ZOBEC clings to itself—stays in place without taping or pinning...conforms snugly to all neck contours without discomfort.

10360

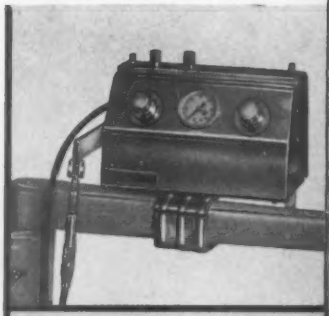
HELPING THE HANDS THAT HEAL

Johnson & Johnson

DENTAL DIVISION

which air-drive is older?

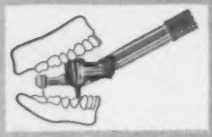
Midwest actually keeps every Air-Drive "400" as new as today! Many improvements have been made to the Air-Drive "400" since it was first introduced . . . the majority of these have been made available to Air-Drive owners FREE OF CHARGE. The balance are optional features that may be added to any Air-Drive regardless of age. There is no "built-in obsolesence" in the Midwest Air-Drive "400". (The Air-Drive Contra Angle pictured at the top is the original model more than two years older than the second one and still performing at peak efficiency).



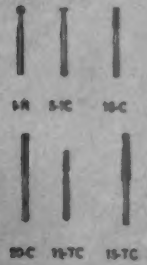
regardless of age . . . every midwest air-drive and most leadi

MIDWEST'S MINIATURE HEAD AIR-DRIVE CONTRA ANGLE

Increase the efficiency of your air driven equipment by adding the Midwest MINIATURE AIR-DRIVE CONTRA ANGLE. Advantageous for both child and adult patient. It's 7 M/M shorter head enables you to do work which could not be done before. Operates in the same speed range as larger air driven contra angles with a considerable reduction in the sound level.



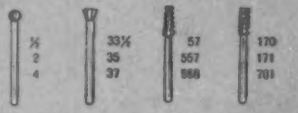
Important for precision cavity preparation. Provides increased working area—greater visibility—better control, easier access to, posterior regions.



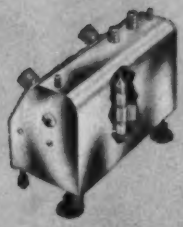
MINIATURE DIAMONDS

Increases efficiency and guarantees a perfect relationship between the angle and the diamond. The overall shortness in the Miniature Head lets you make preparations not easily done with larger head contra angles.

MINIATURE CARBIDE BURS



Made for the Midwest Miniature Contra Angle only . . . guaranteed to have perfect relationship between the bur and the contra angle . . . for even greater precision.



MIDWEST'S WATER WARMER

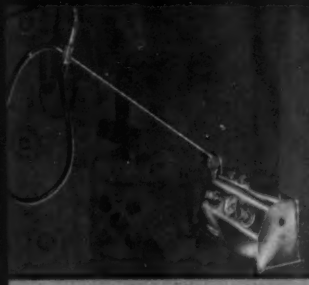
An important innovation for air tubing contra angles is the warming of water for the water spray. This feature adds greatly to patient comfort by reducing thermal shock and adds to the efficiency of the unit.

Water temperature is adjustable through the use of a "hi-lo" switch for summer-winter operation, equalizes water temperature differences in various localities.

MIDWEST'S VARIABLE SPEED FOOT CONTROLLER

Adjusts speed from High to Low and back again. Toe pressure changes bur speeds, provides slower speeds required for fine finishing operations, decay removal, and cutting of dentin. No stops, No delay! At top speed you can reduce speed without going back to stop position by reducing toe pressure. You stand in a balanced position—reduces fatigue. Features a built-in water separator.

ir-turbines can be equipped with these 4 new accessories . . .



MIDWEST'S CONTRA ANGLE SWIVEL SUPPORT ARM

Has all the flexibility of the regular handpiece engine arm plus that provided by the elimination of belts and pulleys. Places air driven contra angle conveniently within reach when operating—can be easily pushed aside when not needed.

MIDWEST'S NEW CONVERSION ADAPTOR KIT

Allows you to adapt the Midwest Miniature Contra Angle to the S.S. White, Ritter, Densco and Weber air turbines. Enables you to use both the Midwest Miniature and your present air turbine angle. When used with the Midwest Miniature Air-Drive, drive air is exhausted into a special receptacle in your control cabinet. Your present air turbine will exhaust in the usual manner.

Midwest Dental Manufacturing Company

1980 N. Hawthorne / Melrose Park, Illinois

USEFUL INFORMATION
at your fingertips!

1961 American Dental Directory

Have you ever needed the address of a former colleague living out of state and couldn't find it? When one of your patients moves to another city are you able to refer him to a dentist practicing there? Or do you have occasion to write to an out-of-town dental school or state society, or find the name and address of a specialist for one of your traveling patients? You can do all of these things with ease when you have an *American Dental Directory*, published annually by the ADA.

Priced at $15.00, the 1,300-page 1961 *Directory* contains a wealth of information unavailable anywhere else at any price. As a handy office reference, it can save you many times its cost in time alone. Below is a partial list of its many departments.

- ***Alphabetical and geographical listing of over 100,000 U.S. dentists***
- ***Complete address, date of birth, dental school, year of graduation and type of practice***
- ***Listings of dental schools, national and state dental organizations and their key personnel, national and state board requirements and hospital internships and residencies***
- ***Classified directory of dental specialists***

Use the coupon below to order today.

AMERICAN DENTAL ASSOCIATION

American Dental Association Order Department
222 East Superior Street, Chicago, Illinois

Please send me the 1961 *Directory*. My remittance of $15.00 is enclosed.

Name_____

Address_____

City_____ Zone____ State_____

576

THE BIRTCHER
HYFRECATOR®

Unrivalled for all technics of Desiccation and Fulguration

Exposure of cavity margin for indirect impression technics

Hemostasis—post extraction and nuisance bleeding from instrumentation

Thousands of Dentists use the Hyfrecator* daily for a wide variety of technics. The pin-point, controlled tissue dehydration and coagulation qualities of the high-frequency current it produces have made the Hyfrecator one of the most valuable instruments in the general practice of Dentistry. Call your Dental Supply Dealer . . . he will be happy to demonstrate the time-saving, time-proven Hyfrecator in your office . . . no obligation.

Reprints of several excellent papers on Dental Hyfrecation plus a new "Question and Answer Booklet" are available on request

WRITE TODAY

THE BIRTCHER CORPORATION
Los Angeles 32, California

**HI-FREquency desicCATOR (not a hot-wire cautery)*

THE BIRTCHER CORPORATION Dept. ADA-161
4371 Valley Boulevard
Los Angeles 32, California

Send me reprints and the new booklet "45 Questions and Answers on Dental Hyfrecation"

Dr. _____

Address _____

City _____ Zone ____ State _____

My Dental Supply Dealer is _____

To clean dentures effectively and safely

WERNET'S DENTU-CREME & DENTURE BRUSH

The professional skill shown in the design and construction of fine dentures is preserved and enjoyed only if your patients provide proper attention to cleaning and maintaining the attractive appearance and fine detail. The desirable course of action is regular use of Wernet's Dentu-Creme and Denture Brush.

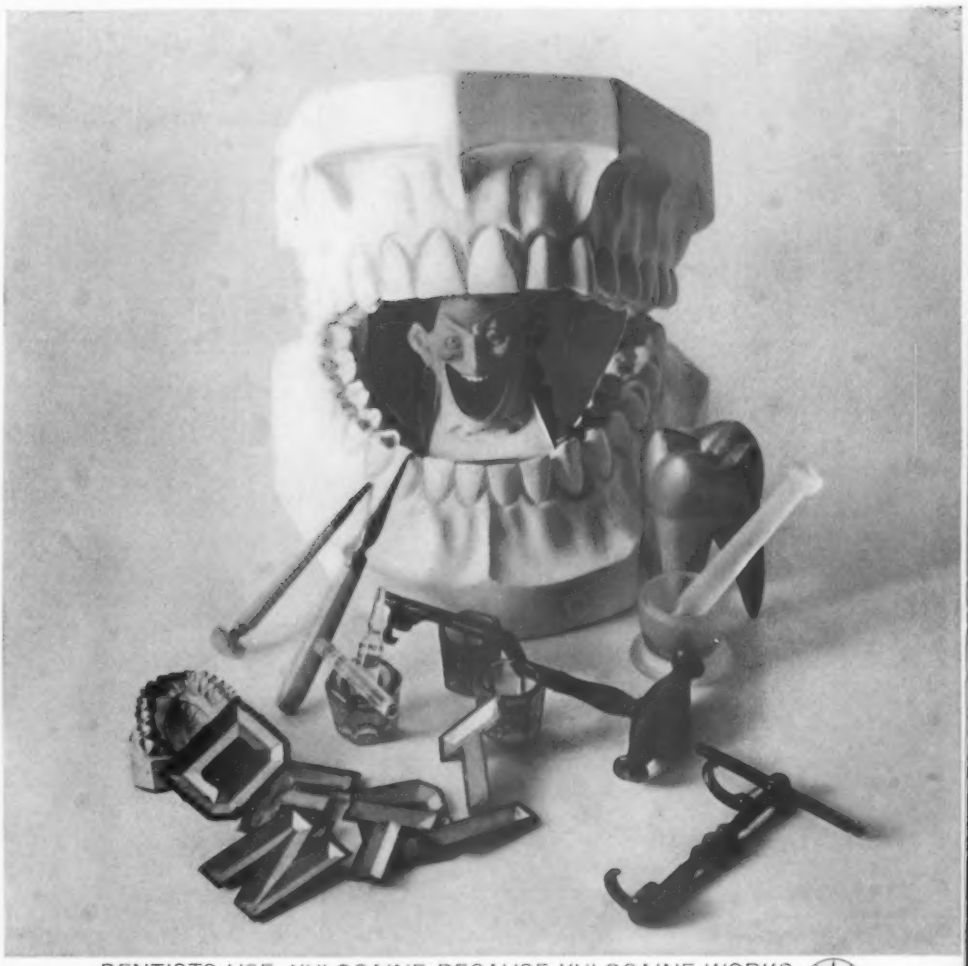
Many dentists recommend this combination for quick, thorough cleansing—food particles, plaque and stains are removed from all denture surfaces without danger to delicate detail.

Dentu-Creme has a foaming action which penetrates crevices and grooves. The activated formula may be used with complete safety on all denture materials: it eliminates the dangers of harsh alkaline chemicals or gritty household cleansers, and is more effective than ordinary toothpaste or mild soap.

The large easy-grip handle and the two functionally designed tufts of nylon bristles make Wernet's Denture Brush the *fitting* companion to fine Dentu-Creme.

BLOCK DRUG COMPANY, INC.
105 Academy Street
Jersey City 2, N.J.
Quality Products for Dental Health

WAVES TRANSMITTED THROUGH A LIVING TOOTH BY A BURR REVOLVING AT A VELOCITY OF 75,000 RPM. XYLOCAINE INTERCEPTS PAIN SENSATION CAUSED BY FRICTION, VIBRATION, PRESSURE, AND HEAT.



DENTISTS USE XYLOCAINE BECAUSE XYLOCAINE WORKS

50,000 XYLOCAINE INJECTIONS GIVEN EVERY HOUR

RELIABLE / fast acting with high diffusibility.
RELIABLE / profound depth and adequate duration of anesthesia.
RELIABLE / wide margin of safety — nonirritating to tissues and relatively nonsensitizing.
RELIABLE / predictable action — effective in 97 per cent of all procedures.
RELIABLE / topical anesthetic — swab, packs or instillation in a cavity.
RELIABLE / bibliography of over 400 published reports.

RELIABLE / PROVED / PREFERRED / In the final analysis, only clinical experience can assure the survival of a drug. It is, therefore, gratifying to know that the performance of Xylocaine, in both dentistry and medicine, appraised in the light of current findings, confirms the original observations made more than a decade ago. Xylocaine has stood the test as a reliable and highly effective local anesthetic.

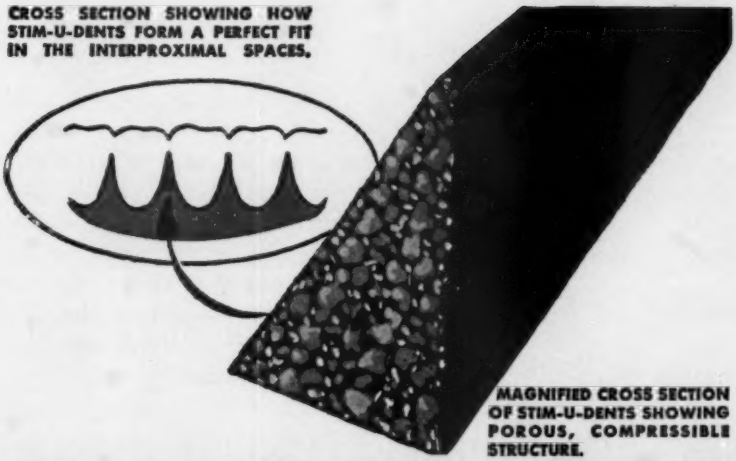
XYLOCAINE® LOCAL AND TOPICAL ANESTHETIC

(BRAND OF LIDOCAINE*)

Astra Pharmaceutical Products, Incorporated, Worcester 6, Mass.

*U. S. PAT. NO. 2,441,498 PRINTED IN U. S. A.

CROSS SECTION SHOWING HOW STIM-U-DENTS FORM A PERFECT FIT IN THE INTERPROXIMAL SPACES.



MAGNIFIED CROSS SECTION OF STIM-U-DENTS SHOWING POROUS, COMPRESSIBLE STRUCTURE.

STIM-U-DENTS

PLAY AN IMPORTANT ROLE

in good interdental hygiene, so vital to good gingival health

Leading periodontists agree that local irritation caused by food residues in areas not ordinarily reached by the toothbrush are an important contributing factor in periodontal disease . . . Not only is the cleansing effect of STIM-U-DENTS useful in the treatment of these diseases, but they are also helpful in the maintenance of optimum gingival health, and are so convenient to use after eating.

If you're not using STIM-U-DENTS in your practice, send for a supply of FREE SAMPLES today. You'll find they are a valuable adjunct to treatment.

Stim-U-Dents, Inc., 14035 Woodrow Wilson, Detroit 38, Mich.

☐ Send Free Samples for patient distribution.

JADA 1-61

Dr._____

Please enclose your Professional Card or Letterhead

Address_____

City_____ Zone_____ State_____

STIM-U-DENTS

FINISH WHAT THE TOOTHBRUSH LEAVES UNDONE

Double three in a line MAXILLARY CENTRALS ... before and after surgery

FIGURE 1

Case illustrated demonstrates two retained maxillary centrals with two impacted supernumerary maxillary centrals preventing the eruption of the maxillary permanent central incisors. Patient, 10 years old, female, with a familial history of similar occurrences during two generations.

Here again is shown the importance of *radiographic support;* in this instance, using periapicals to reinforce the findings of the occlusal radiographs.

FIGURE 2

Note how conclusively the radiographs in these two pages demonstrate the situation.

Preoperative, Figure 1. Clinical photograph showing retained upper deciduous central incisors. Figures 2 through 5 reproduce radiographs visualizing two impacted supernumerary central incisor teeth which prevent eruption of the adult central incisors.

FIGURE 3

FIGURE 4

FIGURE 5

***X-ray Division,* EASTMAN KODAK COMPANY, Rochester 4, N.Y.**

FIGURE 6

FIGURE 7

FIGURE 8

ostoperative, Figures 6 through 9 reproduce ree periapicals and one occlusal which record e adult central incisor teeth after removal of oth deciduous and supernumerary incisors.

FIGURE 9

he more complete the information . . the better the diagnosis

place of the words "more complete" in the ove headline, consider the word "better." For ach and every diagnosis should be based not nly upon sufficient radiographs but radiographs f uniformly high quality—the best obtainable. With uniform quality radiographs, each com- ements the other; periapicals, occlusals, ctraorals—each enhances the over-all picture.

at is why dentists depend upon Kodak dental ray film and Kodak dental x-ray chemicals. ade to work together, they produce uniform, pendable results *when used together.*

ore information . . . with less radiation!

minimize radiation both to patient and to erator . . . to assure better radiographs (more tail, less blurring from movement):

- Use the faster Kodak dental x-ray films;
- Cut exposures to recommended minimum;
- Process in Kodak dental x-ray chemicals.

der Kodak dental x-ray materials m your Kodak dental dealer.

Send for "How to Prevent Toothache" by Howard R. Raper, D.D.S. 50 copies without cost. Additional copies $1.00 per hundred. Interest your patients in tooth preservation.

Kodak
TRADEMARK

Do you have enough income protection? Make certain that the insurance you have will meet present day needs . . . or you may face real financial hardship.

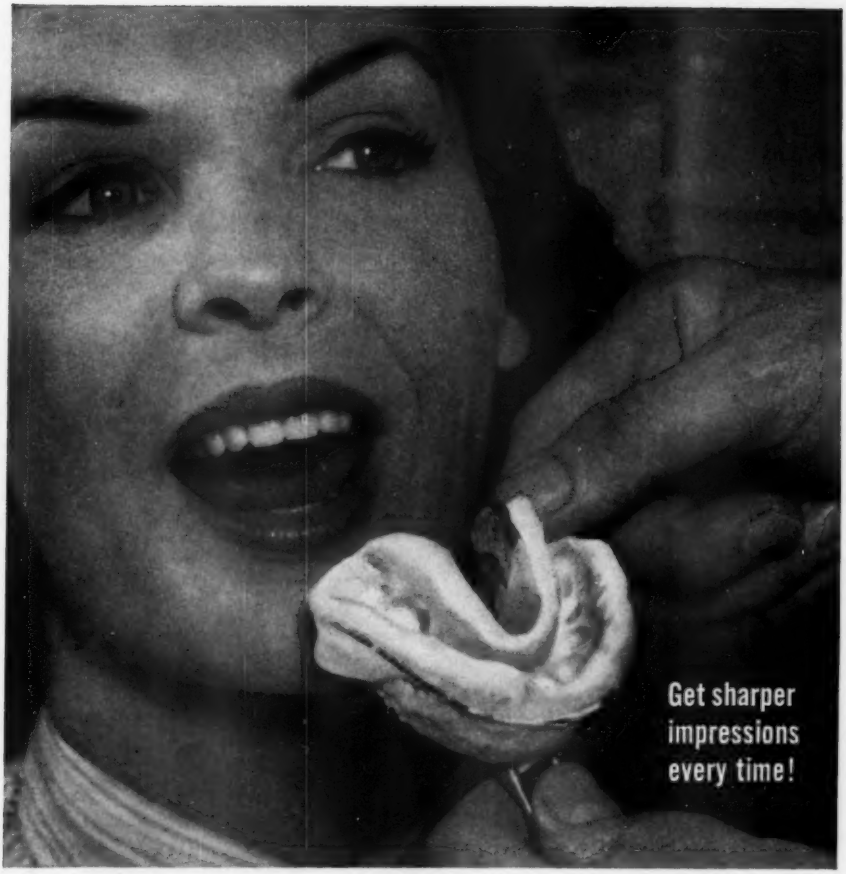
While disabled, your American Dental Association Group Accident and Health Insurance Plan will pay up to $600 per month (according to plan issued) TAX-FREE under existing laws. It provides benefits for disability resulting from accident beginning with the first day for as long as five years, including six months for partial disability. You receive benefits for disability resulting from sickness beginning with the eighth day for as long as two years.

This Plan provides full benefits regardless of any other insurance you may be carrying. No restrictions on how the money is used . . . for medical bills, food or continuing office expenses.

For complete information regarding benefits, provisions and semi-annual rates, write the Trustee of the Policy, Dr. Paul Zillmann, 29 Walden Avenue, Buffalo 11, New York; or write M. A. Gesner, Inc., 216 East Superior Street, Chicago 11, Illinois.

Issued exclusively by **National Casualty Company of Detroit** *through M. A. Gesner, Inc., 216 East Superior Street, Chicago 11, Illinois – Phone WHitehall 3-1525.*

Since the National Casualty Company's plan of accident and health insurance is in effect on a State Society basis in New York, New Jersey, California, Utah and Nevada, the Association Plan is not available in those states.



LAVORIS MOUTHWASH HELPS YOU WORK 3 important ways...

- **"Cuts" Mucus Film.** A rinse with full-strength Lavoris before an impression helps clear away mucus, prevents air bubbles. Many dentists now use Lavoris this way routinely.
- **Keeps Operative Area Cleaner.** Lavoris' unique cleansing action effectively and thoroughly cleans away mucus, food particles and impurities. Use Lavoris Spray ½ strength or stronger. (Wouldn't you rather work in a Lavoris-clean mouth?)
- **Helps Promote Patient Comfort.** To nervous patients, even minor discomforts loom large. The pleasant taste and feel of Lavoris refreshes, helps keep them at ease. The bright red color of Lavoris helps mask minor hemorrhage.

LAVORIS

CLEANSING • REFRESHING

used by more dentists than any other mouthwash!

PROFESSIONAL GAL. SIZE, ONLY $2.50.

Send check to LAVORIS DIVISION, Vick Chemical Co. Box 990, Wilmington 99, Del.

Samples for office and patient use available on request.

Classified advertising

Forms close on 20th of second month preceding month of issue.

Remittance must accompany classified ads. Classified advertising rates are as follows:

30 words or less—per insertion.....$6.00
Additional words, each..... .15

Answers sent c/o A.D.A.... no extra charge

Replies to A.D.A. box number ads should be addressed as follows:

American Dental Association
222 E. Superior Street
Chicago 11, Ill. Box _____

Box number must appear on the envelope.

PRACTICES AND OFFICES FOR SALE AND/OR RENT

ALABAMA—Northeast. For sale. Established general practice, equipment and stock. Located in thriving professional building in metropolitan area of 50,000. Will finance. Address A.D.A. Box No. 159.

CALIFORNIA—San Jose. For rent. New dental suites—one available. Practice assured. Heat pump conditioners. Excellent opportunity for orthodontist and pedodontist locating in adjoining building. Contact Dr. James O. Edwards, 1449 Park Ave., San Jose 26, Calif.

•

CALIFORNIA—For sale. Fully equipped modern dental office in growing northern California. Excellent all year recreation. High annual gross. Interesting and diversified dental practice. Little competition. Reasonable. Must sacrifice. Address A.D.A. Box No. 160.

•

CALIFORNIA—Highland Professional Center of Los Angeles has one suite left. Three operatories have northern exposure into a beautiful garden. Suite is air conditioned, has hi fi music and ample parking space. Exceptional opportunity for orthodontist—none in area. Contact Mr. Almskog, 5823 York Blvd., Los Angeles 42, Calif.

Flexible and Strong!

Buffalo Dental SPATULAS

Buffalo Dental Stainless Steel Spatulas have the desired combination of strength and flexibility. They are available in a wide variety of blade sizes.

"R" Group Blades are of finest quality stainless steel and are fastened securely with 2 heavy brass rivets into polished rosewood handles.

Write for detailed information on Buffalo Dental Spatulas—"Green Line" and "R" Group.

Buffalo Dental Mfg. Corp.
2911-23 Atlantic Ave., Brooklyn 7, N. Y.

CALIFORNIA—Central Valley. Three-chair office space available. Share new building with two extremely busy physicians. Prosperous community. Excellent opportunity. Write Dr. J. J. Wolohan, P. O. Box 398, Livingston, Calif.

•

CALIFORNIA—Southern. For sale. Solid practice established 12 years. Four and one-half day week earns $35,000. Low overhead. Fully equipped. Instruments, furnishings and supplies. No down payment. Take over monthly equipment payments only. Address A.D.A. Box No. 996.

•

COLORADO—Denver. For sale. Active general practice. Modern, air conditioned office. New equipment. Wonderful opportunity. Pay for equipment only. Leaving to specialize. Address A.D.A. Box No. 161.

•

CONNECTICUT—For sale. Two-chair dental practice. Town of 6,500. Other full time dentist lives elsewhere. Twenty minutes from Hartford. Address A.D.A. Box No. 162.

•

CONNECTICUT—For sale. Modern, newly decorated two-chair dental office building and general practice of deceased dentist. Completely and attractively furnished. Like new equipment. Excellent location. Address A.D.A. Box No. 163.

•

ILLINOIS—Chicago. Irving Park, Damen, Lincoln intersection. Space available for one dental practice. Office is modern, ground floor, air conditioned, parking. Remainder of space occupied by several physicians. Call WHitehall 4-3336.

•

ILLINOIS—Northern. For sale. Orthodontic practice. Formal or preceptor training essential. Step into a busy, lucrative practice. Investigate this opportunity today. All replies confidential. Address A.D.A. Box No. 140.

•

NEW JERSEY—Camden. For sale or rent. Well established practice. Employment or association acceptable. Two-chair office in busy industrial area with great potential. Address A.D.A. Box No. 164.

•

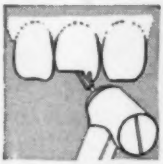
OHIO—For sale. Residence-dental office. Fully equipped with Ritter Trident, x-ray, miscellaneous supplies, etc. Excellent opportunity. Former owner deceased. No other dentist. Prosperous rural community. Contact Paul Clark, 405 N. Main St., Arcanum, Ohio, associate Rhodes Realty Co., Greenville, Ohio.

•

OHIO—For sale. Excellent three-chair office. Averaged over $60,000 past ten years. Retiring. Can offer very attractive proposition whereby office will pay for itself. Address A.D.A. Box No. 165.

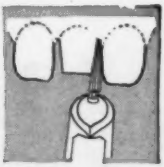
Ultra Speed Technique No. 1
using
BUSCH-WIDIA
ENAMEL SHAVERS

Preparation of the Jacket Crown
(Time—15 minutes)



Gross Reduction of Incisal Edge
Using ENAMEL SHAVER No. 173L brush mesial to distal, holding bur at right angle to incisal edge.

Reduction of Mesial and Distal Sections, to Shoulder of Gingiva



Using same ENAMEL SHAVER and moving bur from the labial to the lingual, in planes which converge slightly towards the incisal edge, as illustrated, reduce and place shoulder in one operation.

Reduction of Labial and Lingual Sections
Still using the No. 173L ENAMEL SHAVER, lingual and labial reduction is accomplished by holding the bur parallel to long axis of tooth and shaving from mesial to distal.

For final finishing, and bevel of shoulder, use a HORICO DIAMOND INSTRUMENT No. 1xL.

173L	173La	173Lr	173Lra	173Lp
Square, endcutting	Square, safe end	Round, endcutting	Round, safe end	Pointed endcutting

Write for complete catalog No. 120.

PFINGST & COMPANY, INC.
62 COOPER SQUARE • NEW YORK 3, N. Y.

a NEW concept

in Doctors' bookkeeping ...the

Master Edition

BOOKKEEPING SYSTEM

by

HISTACOUNT®

featuring

Guide-U.

a built-in guidance system for complete accuracy when making entries and transfers.

FREE BOOKLET, containing instructions and sample pages, sent free on request - no obligation.

PROFESSIONAL printing company, inc.

21 HISTACOUNT BUILDING

NEW HYDE PARK N Y

OHIO—Cincinnati. For sale. Very fine combination home and two-chair dental office in center of prominent city suburb. Equipment optional. Prestige location. Excellent opportunity. Address A.D.A. Box No. 166.

•

OHIO—Akron suburb. Office for lease in ultra-modern medical building. Ready for occupancy in March. Address A.D.A. Box No. 167.

•

PENNSYLVANIA — Reading. For sale. Six room office attached to seven room ranch brick and frame house. Excellent suburban neighborhood. New Ritter equipment, high speed. Parking. Owner specializing. Address A.D.A. Box No. 168.

•

PENNSYLVANIA—Erie. For rent. Established office shortly to be vacated by dentist. Excellent residential location adjacent to downtown business area. Good parking facilities. Address A.D.A. Box No. 144.

•

WEST VIRGINIA—For sale. Modern one-chair air conditioned office. Equipment three years old—includes x-ray, Airotor, etc. A growing practice in a good fee area. Address A.D.A. Box No. 169.

•

WISCONSIN—For sale or rent. Fully equipped dental office, two chairs, living quarters included. Practice located in resort area badly in need of a dentist. Present owner ill. Write Mrs. F. W. Fosmo, Webster, Wis.

OPPORTUNITIES AVAILABLE

CALIFORNIA—General practitioner wanted for full time associate with a group practice located 75 miles south of San Francisco. Opportunity to become a full partner. Four dentists, orthodontist, hygienist, laboratory and x-ray facilities in new, modern building. Give full information regarding age, marital status and special dental training or experience in reply. Address A.D.A. Box No. 170.

•

CALIFORNIA—Wanted. Orthodontist for group practice in southern California. Must have California Boards and formal edgewise technic training. Starting salary $18,000 per annum. Address A.D.A. Box No. 922.

•

CALIFORNIA—Wanted. Qualified general practitioner for group practice in southern California. Address A.D.A. Box No. 777.

•

NEW JERSEY—Wanted. Associate for general practice. Busy modern office. Net income of $12,000-$18,000. Population 25,000, drawing area 50,000. Forty miles to Philadelphia, 40 miles to seashore. Give full background and references. Address A.D.A. Box No. 171.

℞ FLUORITAB

1 milligram of fluorine

FLUORIDE TABLETS

suggested retail price — $1./100

Available in drug stores on your prescription or for dispensing in your office

Complete information, J.A.D.A. reprints, samples, dispensing labels, prices, and prescription instructions, furnished free upon request. Write to:

Fluoritab Corporation, 625 South Saginaw Street, Flint 2, Michigan

---

PENNSYLVANIA—Associate wanted for busy general practice in northwestern Pennsylvania resort area. Airotors, suction, Audiac, air conditioning, etc. Splendid opportunity for right person. Address A.D.A. Box No. 172.

•

TEXAS—Approved prosthetic residency available in 1,300 bed general hospital affiliated with Texas University Dental School. Stipend $3,495-$4,475 per annum. U. S. citizenship required. Contact Chief, Dental Service. VA Hospital, Houston, Texas.

HYGIENISTS

Dental hygienist. $436-$530. Provides instruction and consultation in dental health in health department program. All civil service benefits. Requires completion of approved two or four year course in dental hygiene plus one year as dental hygienist in school or health department plus eligibility for California certificate. Apply Alameda County Civil Service Commission, 12th & Jackson Sts., Oakland, Calif.

OPPORTUNITIES WANTED

CALIFORNIA—Oral surgeon, 36, veteran, 1952 graduate, three years' approved training, general anesthesia experience, desires association with established surgeon leading to partnership or purchase. Address A.D.A. Box No. 146.

•

Dentist, Minnesota and Colorado licensed, 11 years' experience private practice, two years' military, age 38, desires association in group or clinical practice. Willing to make investment. Address A.D.A. Box No. 173.

•

NEW JERSEY. Dentist, married, age 28, two years' Navy service, two years' general practice experience desires association leading to partnership or purchase. Excellent references. Own modern equipment available. Prefer north Jersey. Address A.D.A. Box No. 174.

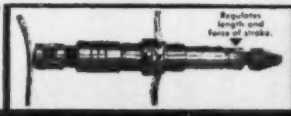
"SPEEDY"
SYNTHETIC RESIN SEPARATING DISKS and CUT-OFF WHEELS

Tired of the nuisance of changing broken disks before the job is done?

- **Last longer, will not clog**
- **Cut fast, don't generate heat**
- **Less breakage due to the synthetic base**
- **No odor**
- **For chrome-cobalt alloys, etc.**
- **Available in ¾" and ⅞", safe side, double side, flat or cup shape**

PRICES { Box of 100 ..... $2.25
220 assorted in plastic box..... $5.00
Cut-off wheels, 1½", box of 50..$7.50

NEW! 1961 MODEL
Union Broach Automatic
SURGICAL MALLET



Never before was there a surgical instrument that does so much with so little effort on the part of the operator.

With 6 Points— **$40.**

UNION BROACH CO., INC. 80-02 51st AVENUE, ELMHURST 73, N. Y. Literature upon Request

SEND FOR OUR NEW 74 PAGE CATALOG!

SHIP YOUR HARD STONE MODELS TO US

Use business reply label (below) no postage, no money, no C.O.D.

HARD STONE MODELS that you make from your HYDROCOLLOID, ALGINATE, SILICONE and RUBBER impressions are now gladly accepted for the construction of beautifully natural-appearing and perfect fitting porcelain jackets and bridges.

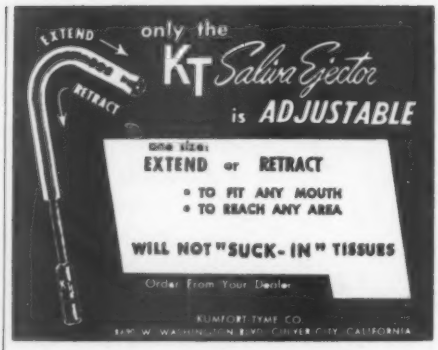
Please do not place dowel pins or cut model apart, we will do that.

USE THIS LABEL TO SHIP MODELS OR TO REQUEST TEN PIECES OF INTERESTING DENTAL CERAMIC LITERATURE.

BUSINESS REPLY LABEL
No Postage Necessary If Mailed in the United States

FIRST CLASS
PERMIT NO. 50786
CHICAGO, ILL.

POSTAGE WILL BE PAID BY—
M. W. SCHNEIDER
DENTAL LABORATORY
27 East Monroe Street
A 1-61 CHICAGO 3, ILLINOIS



NEW YORK—Purchase or association leading to purchase or partnership wanted by dentist. Age 29. Experienced, well qualified, military service completed. City, suburban or upstate considered. Address A.D.A. Box No. 175.

•

WASHINGTON—U. W. graduate, age 28, completing military obligation with Navy July 1961. Interested in purchase or association in general practice in the Seattle to Bellingham area. Left handed. Address A.D.A. Box No. 176.

•

Oral surgeon, age 29, completing third year approved training including all types of anesthesia, desires association (July 1, 1961) with oral surgeon, group practice or opportunity to locate. Military obligation completed. Connecticut, New York and National Boards. Will take necessary Boards. Address A.D.A. Box No. 987.

•

Oral surgeon with training in general and intravenous anesthesia, desires association with oral surgeon or opportunity to purchase practice in California or Chicago area. Military obligation completed. Available July 1961. Address A.D.A. Box No. 133.

•

General practitioner with prosthetics experience in cleft palate and facial restorations (one and one half years N. U. Cleft Lip and Palate Institute) desires permanent position with hospital or institution in U.S. or abroad. Age 41. Address A.D.A. Box No. 177.

•

Oral surgery resident, age 31, completing third year A.D.A. approved program leading to M.S. in oral surgery including six months general anesthesia training, desires association or opportunity to locate as of July 1, 1961. Military obligation completed. Have Michigan and Florida Boards. Address A.D.A. Box No. 178.

New! Efficient!

All-in-one record keeper—the latest single entry multi-purpose method of duplicating office records—PRO-FORMS!

If you have everything—modern equipment, functional offices, trained assistants—and don't have PRO-FORMS—you can still add greater efficiency and profits to your present practice.

For further information write your PRO-FORMS dealer or

PRO-FORMS INC.
Jenkintown 16, Pa.

Save time and money on your trip to Britain! English dentist will arrange custom tour tailored to your own interests and desires. See more for less. For details, write Kenneth A. Fellows, L.D.S., 27A Fore St., St. Marychurch, Torquay, England.

FOR SALE

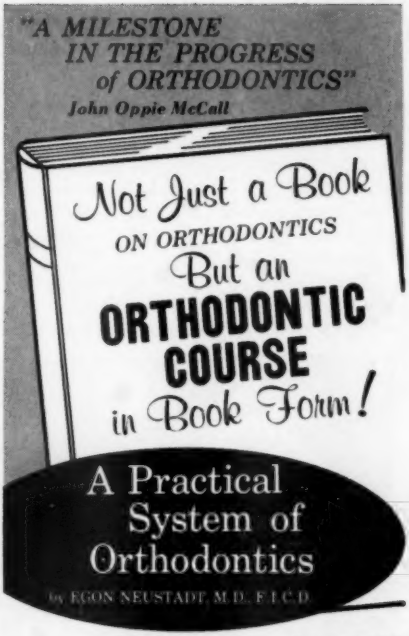
COLORADO—For sale. Two Ritter chairs, two Ritter units, two American cabinets, Weber x-ray and other items of equipment sufficient to supply a two-chair office. Oldest of this equipment is six years. All in excellent condition. For further information address A.D.A. Box No. 179.

•

Proven profitable established dental supply company for sale. Over 45 years of continuous business at same location. Must sell to settle estate. For full information write Conger Dental Supply, c/o Wayne Probasco, 902 First National Bank Bldg., Topeka, Kans.

•

For sale. Chayes-Page high speed contra angle with air filter, tubing and brackets. Model X-1, like new. $200. Dr. G. E. Conrad, 2604 Bardstown Rd., Louisville 5, Ky.



832 Pages . . . Over 1000 Original Illustrations

To everyone interested in orthodontics, this remarkable book has something special to offer:

GENERAL PRACTITIONER • **A comprehensive course, covering every phase of orthodontics** • logical step-by-step sequence of procedures • clear-cut explanations for many heretofore obscure aspects • emphasis on periodontal, operative and prosthetic problems.

PARTIAL SPECIALIST • A sound diagnostic approach and case analysis • **a precise treatment plan for every type of malocclusion** • a standardized method of appliance design • a simplified, well-illustrated appliance technique • effective control of clinical adjustments.

EXCLUSIVE SPECIALIST • **A comprehensive and practical classification of malocclusions** • differentiation between arch material and arch form • analysis of arch form on the basis of arch length and arch width • distinction between intra- and inter-arch abnormalities • new concept of etiologic forces as related to problems of retention • three-dimensional aspect of diagnosis: antero-posterior, laterosagittal, apico-occlusal • **a survey showing direction and distance of required tooth movement** • diagram outlining correction of case by progressive treatment steps • reciprocity of orthodontic forces with nonexistence of "stationary anchorage." Complete case reports leading from diagnosis to classification, survey, treatment plan, appliance design, clinical adjustments, habit correction and retention.

NEUSTADT, A PRACTICAL SYSTEM OF ORTHODONTICS

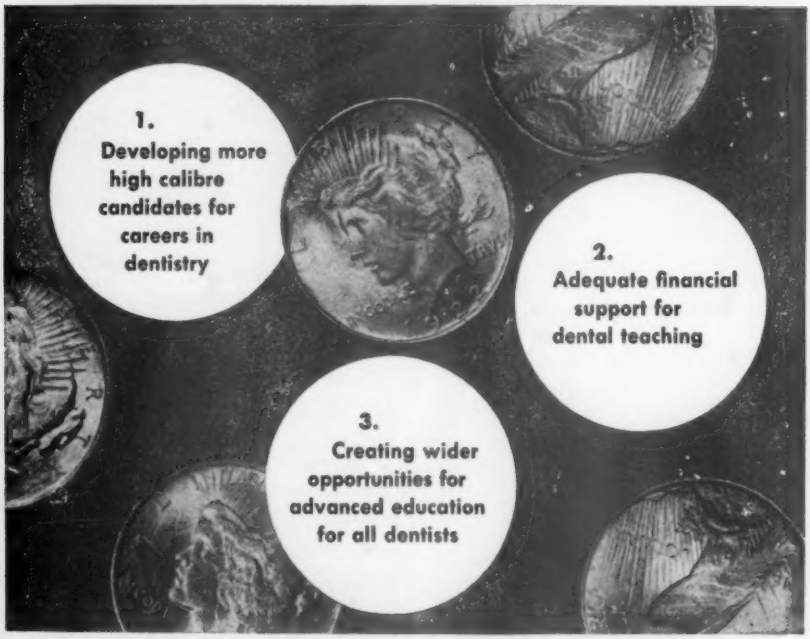
Order Today for 10-Day FREE Examination, or remit $28.50 to save all shipping charges. (Same Money-Back Guarantee Applies.)

THE FAIRFIELD PRESS
128 East 62nd St., New York 21, N.Y.

DEDICATED DOLLARS

There is a mighty warm inner glow. . . a wonderful sense of personal self-satisfaction in *giving* . . . particularly when your "dedicated dollars" will help to advance the future of dental education and *your own dental profession.*

Your "dedicated dollars" donated annually to dental education's very own fund will go a long way toward achieving these three primary objectives. The program of The Fund for Dental Education offers every practicing dentist a most worthwhile opportunity to invest in the future of his chosen profession. All contributions are used for the support of dental education and are tax-deductible. Fill in the coupon below and put your "dedicated dollars" to work today.


1.
Developing more high calibre candidates for careers in dentistry
2.
Adequate financial support for dental teaching
3.
Creating wider opportunities for advanced education for all dentists

To: THE FUND FOR DENTAL EDUCATION
840 NORTH LAKE SHORE DRIVE, CHICAGO 11, ILLINOIS

Sponsored by: The American Association of Dental Schools
Endorsed by: American College of Dentists; American Dental Association; American Dental Trade Association.

I would like to invest _____ "dedicated dollars" in the program of The Fund for Dental Education.
AMOUNT

Dr. _____

Street _____

City _____ State _____

(Make your Check payable to: The Fund for Dental Education)

Jane's
postoperative pain
is relieved by

Zactirin®

Ethoheptazine Citrate with Acetylsalicylic Acid, Wyeth

Non-narcotic ZACTIRIN provides potent analgesic and anti-inflammatory action that promptly relieves pain of trauma, infection, dental or oral surgical procedures. Two ZACTIRIN tablets are equivalent in analgesic effectiveness to codeine, 32 mg. (½ gr.) plus acetylsalicylic acid, 650 mg. (10 gr.). Side reactions are minimal.

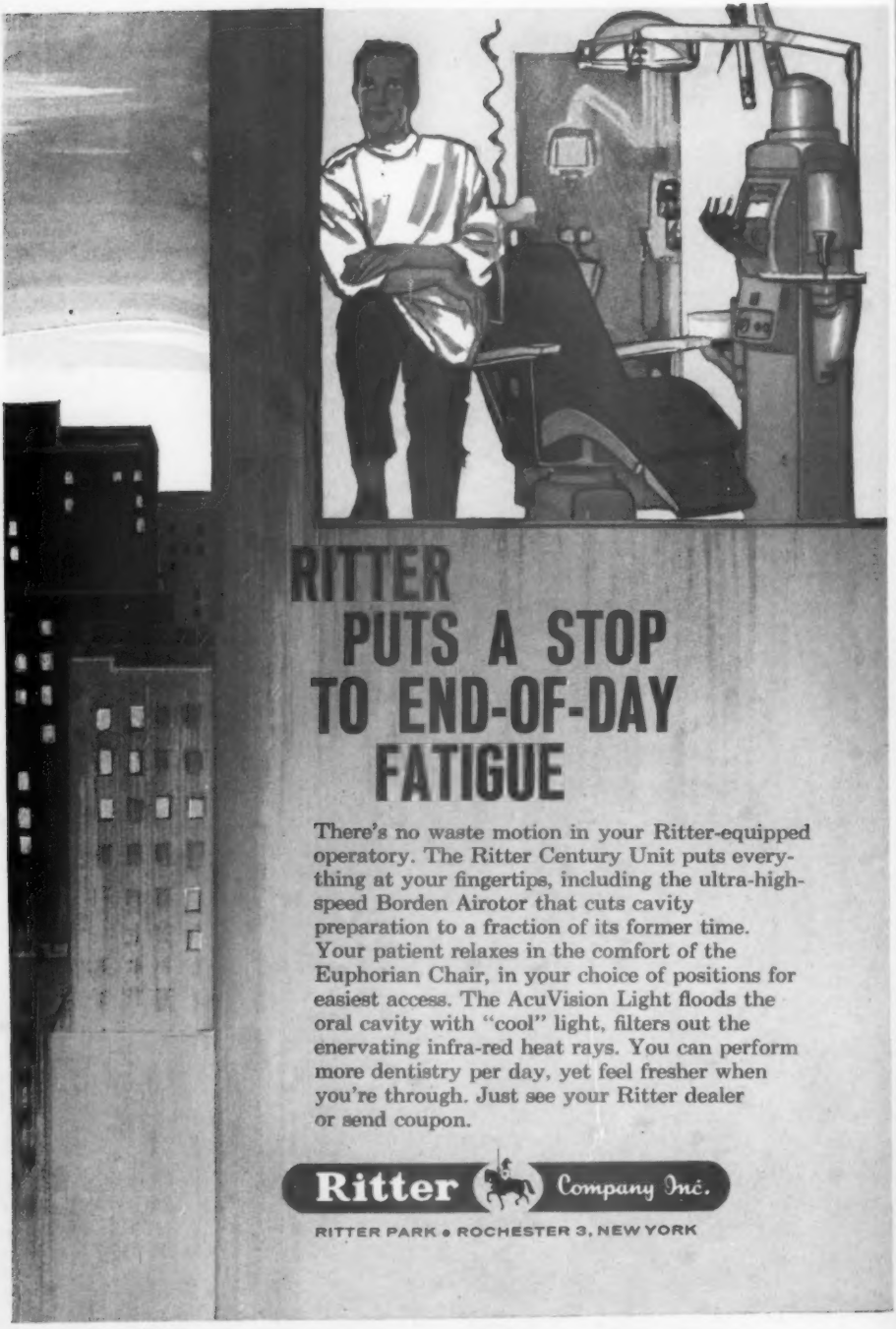
Supplied: Tablets, bottles of 48. Each tablet contains 75 mg. (1.14 gr.) ethoheptazine citrate (yellow layer) and 325 mg. (5 gr.) acetylsalicylic acid (green layer).

Wyeth Laboratories Philadelphia 1, Pa.

100 ANNIVERSARY 100

Wyeth®

A Century of Service



RITTER
PUTS A STOP
TO END-OF-DAY
FATIGUE

There's no waste motion in your Ritter-equipped operatory. The Ritter Century Unit puts everything at your fingertips, including the ultra-high-speed Borden Airotor that cuts cavity preparation to a fraction of its former time. Your patient relaxes in the comfort of the Euphorian Chair, in your choice of positions for easiest access. The AcuVision Light floods the oral cavity with "cool" light, filters out the enervating infra-red heat rays. You can perform more dentistry per day, yet feel fresher when you're through. Just see your Ritter dealer or send coupon.

Ritter Company Inc.

RITTER PARK • ROCHESTER 3, NEW YORK

STOP END-OF-DAY FATIGUE WITH...

RITTER CENTURY UNIT

Now featuring ultra-high-speed Borden Airotor as standard equipment. So compact—notched cuspidor arm swings closer to chair for smaller operating area. So handy—all instruments in single unit, within effortless reach.

RITTER EUPHORIAN CHAIR

"Fitted" to the patient...gives complete body support with weight evenly distributed. Touch-of-the-toe elevation and tilt, slide-away arm rests are features that bring greater operational efficiency and pleasanter practice days for you.

CASTLE ACUVISION LIGHT

Exclusive *Transtherm* cooling keeps heat from you and patient. Exclusive *High Visibility* lighting from 28 different angles—you can block out more than half the beams and still see perfectly!

Ritter/Castle ...FINER PROFESSIONAL EQUIPMENT

Ritter Company Inc.

RITTER COMPANY INC.
3401A Ritter Park, Rochester 3, New York

Please rush information on ☐ Century Unit ☐ Euphorian Chair ☐ AcuVision Light ☐ Century X-Ray.

NAME .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

Nothing to break the network of strength

In Diafil you get a finely milled powder from unique grouping of silicates, which, mixed as directed, gives dense network of incompletely dissolved powder particles, suspended in matrix of silica gel.

High density assures extra hard fillings, with low solubility and great crushing strength.

At a sensible price

10/2 UNIT
10 Powders (18 gms. ea.)
2 Liquids (15cc ea.)
1 Shade guide $33.00
(Other combinations also available)

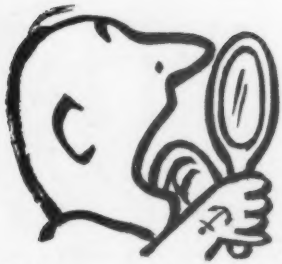
DIAFIL

For anterior and posterior fillings

In its new, modern packaging

Write for free sample
(Sample liquid in bottle only)

PFINGST & COMPANY, INC.
62 COOPER SQUARE • NEW YORK 3, N.Y.



Floss users spot defects sooner, see dentist more often. 71% had seen dentist in past six months.

Floss users brush more. Nine out of ten brush twice daily; 27% brush three times a day.

Floss users swear by the stuff. Most begin at dentist's advice; 70% then become daily users.

How Dental Floss Makes People "Teeth Conscious"

Some interesting survey results

Apart from combating caries, an interesting aspect of dental floss is that users become unusually "teeth conscious."

Brush more—see dentist often

A recent survey reveals that nine out of ten floss users brush their teeth at least twice a day; 27% brush three times a day.

Even more surprising is the frequency with which they visit their dentist. 99% had seen a dentist within the previous twelve months; 71% within the past six months.

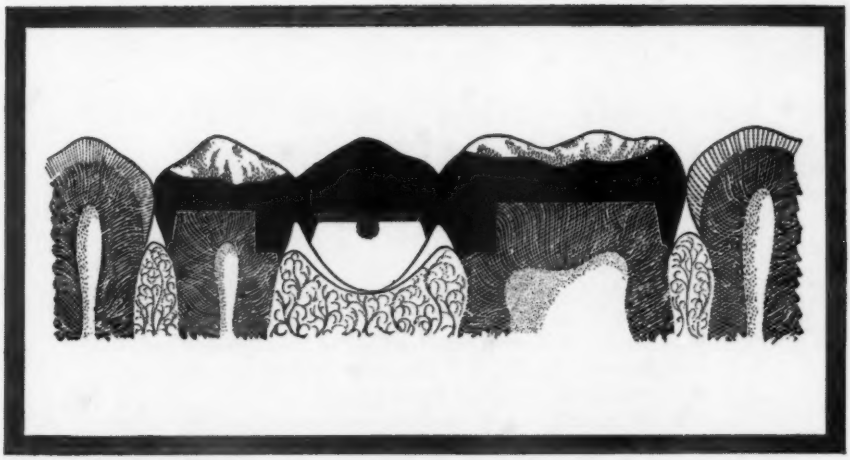
Follow dentist's advice

Use of dental floss is generally begun at the advice of a dentist. But once started, patients themselves become its staunch advocates, 70% continuing daily use thereafter.

Thus it is clear that dental floss is more than an effective weapon against caries. When recommended by a dentist it becomes a unique means of improving a patient's general care and concern for his teeth.

FREE ON REQUEST . . . a simple, explanatory booklet for patients, entitled "How to Use Dental Floss." Contents approved by American Dental Association. Write, stating quantity desired. Johnson & Johnson, Dept. J. New Brunswick, N. J.

Johnson & Johnson

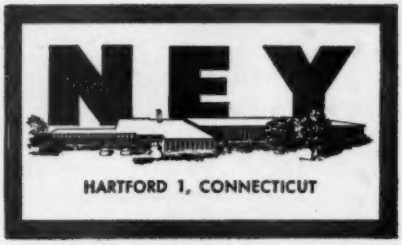


MANDIBULAR SANITARY PONTICS

The "sanitary pontic" shown above for the lower arch is spheroidal in shape and constructed in such a manner that it barely touches the ridge with a rounded ridge tip contact. (The cone-tip type of pontic is not used in the lower arch, because it adds nothing to the esthetic values.) In the relationship between sanitary pontic and ridge, contour should equalize mesial and distal embrasures. The facing is beveled to increase soldering area on the pontic casting. The backing is beveled toward the facing to provide mechanical lock for wax and gold.

There are times when the lower ridge is excessively resorbed and in such instances the pontics may be shortened gingivally so that they do not contact the ridge. Enough space, however, must be left between the pontic and the ridge to permit the tongue and cheek to keep the underlying porcelain clean.

Another point, stressed in previous Ney advertisements, is the importance of having proper contact areas with the teeth adjacent to the bridge abutments, and allowing for properly formed interproximal spaces. A correct contact area, not too close to occlusal, nor too far to gingival, and not too broad in actual contact itself, allows food to sweep into the embrasures which are shaped to provide a sluice-way effect with resulting tissue stimulation and self-cleansing action. The J. M. Ney Company, Hartford 1, Connecticut.



UNIQUE

Among dental publications, *Dental Abstracts* remains "one-of-a-kind." Its purpose: To give you, as a general practitioner, the very latest information available on new technics, drugs and instruments that can mean time and money to a busy practice.

Each month, in a concise, easy-to-read, easy-to-assimilate digest format, *Dental Abstracts* gives you useful and pertinent material carefully selected from the world dental and medical literature. With the barest amount of reading time, you can stay informed of new developments in all areas of dental science from anesthesia to therapeutics. The original articles are always available to subscribers on a free-loan basis.

Why not gain the benefits of *Dental Abstracts* for your office. Order today by using the coupon below.

— — — — — — — — — — — — — — —

AMERICAN DENTAL ASSOCIATION
Subscription Department
222 East Superior Street
Chicago 11, Illinois

Please enter my subscription to *Dental Abstracts*.
(1 year — $8 U.S., $9 overseas) My remittance is enclosed.

Name_____

Address_____

City_____ Zone____ State_____

574

and although various alginate materials are available at considerably lower cost, I still prefer Jeltrate. It is always reliable and accurate. I never have to worry about the impression.

Dr.

This letter is NOT in our files. We made it up. But we followed, practically word for word, the oral comments of a dentist who recently visited our laboratories in Milford. And we are glad that his opinion of Jeltrate is shared by so many others.

CAULK Milford, Delaware

INSTITUTE ON HOSPITAL DENTAL SERVICE

Somerset Hotel
BOSTON, MASSACHUSETTS
May 15-18, 1961
REGISTRATION FEE $40

The institute will direct attention to the problems associated with rendering effective dental service in the hospital—from the viewpoint of the dentist, the administrator and the hospital staff.

Sessions will include discussions on the economics of providing dental care in the hospital, the position of dental service and its organization, the position of the dentist on the staff, interdepartmental relations, out-patient dental care and dentistry's contribution to the hospital and the community.

conducted cooperatively by
AMERICAN DENTAL ASSOCIATION
AMERICAN HOSPITAL ASSOCIATION

Council on Hospital Dental Service
American Dental Association
222 E. Superior Street
Chicago 11, Illinois

Please send me information on the Institute on Hospital Dental Service.

Name_____

Address_____

City_____ Zone____ State_____

RAPID in DESTRUCTION

of commonly encountered
VEGETATIVE BACTERIA
Free from Phenol (Carbolic Acid) and Mercurials

BARD-PARKER

CHLOROPHENYL

This Powerfully Efficient Instrument Disinfecting Solution for **WARD—OFFICE—CLINIC IS . . .**

- Non-corrosive to metallic instruments and keen cutting edges
- Non-injurious to skin or tissue
- Free from unpleasant-irritating odor
- Non-toxic—stable for long periods
- Potently effective even in the presence of soap
- Inexpensive to use

B-P INSTRUMENT CONTAINER No. 300
Accommodates up to an 8" instrument. Ideally suited for use with Bard-Parker CHLOROPHENYL

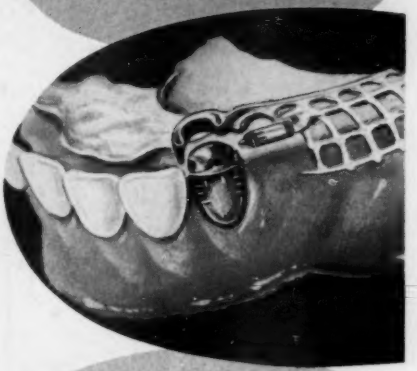
Ask your dealer

BARD-PARKER COMPANY, INC.
DANBURY, CONNECTICUT
A DIVISION OF BECTON, DICKINSON AND COMPANY

B-P and CHLOROPHENYL are trademarks

ALL BARD-PARKER SOLUTIONS CONSERVE THE BUDGET DOLLAR

A most effective and proven device for PARTIAL DENTURE RETENTION



tach-e-z

the coil spring attachment

After years of use discriminating dentists in the U.S. and many foreign countries have recognized and accepted the superior value of TACH-E-Z for:

- **Function**
- **Esthetics**
- **Positive Retention**

All parts are interchangeable and adjustable at the dental chair. Conventional techniques and procedures will yield the finest results.

Guarantee
TACH-E-Z is unconditionally guaranteed to the dentist for the useful life of any denture.

Adjustment Wrench

Contact your dental laboratory, local dealer or write to

WHALEDENT, Inc.
304 Kingston Avenue
Brooklyn 13, N.Y.

New from McGraw-Hill

The Practice of PERIODONTIA

"The . . . practitioner will find this book an asset in the treatment of periodontal pathology."
N.Y. Journal of Dental Medicine

by
SIDNEY SORRIN
D.D.S., F.A.C.D., F.A.D.M.

Professor of Periodontia and Oral Medicine and Chairman of the Department of Periodontia and Oral Medicine, New York University College of Dentistry

With the cooperation of the faculty of the Department of Periodontia and Oral Medicine, New York University College of Dentistry

THIS WORK is a complete guide to periodontia, starting with the basic science background necessary for an understanding of the subject, and following through the diagnosis, prognosis, and treatment planning of periodontal disease.

A large portion of THE PRACTICE OF PERIODONTIA is devoted to the techniques of practice, including a full discussion of occlusal equilibration and splinting of teeth. Close correlation of text descriptions and illustrations enable the reader to follow each technique presented, step-by-step. The section on the proper use of instruments and both the conservative and so-called radical surgical approaches to treatment completes the coverage of the book.

496 pages, 7¼ x 9⅞, illustrated, $19.50

DENTISTRY FOR CHILDREN, 4th Edition
By John C. Brauer, D.D.S.; William W. Dermeritt, D.D.S.; L. B. Higley, D.D.S.; Roy L. Lindahl, D.D.S.; Maury Massler, D.D.S.; Isaac Schour, D.D.S. 492 pp., 6 x 9, 291 illus., $11.00.

A TEXTBOOK OF OPERATIVE DENTISTRY, 4th Edition
By William H. O. McGehee, D.D.S.; Harry A. True, D.D.S.; E. Frank Inskipp, D.D.S. 720 pp., 6 x 9, 423 illus., $14.00.

THE DENTAL ASSISTANT, 2nd Edition
Edited by John C. Brauer, D.D.S., and Richard E. Richardson, D.D.S. 593 pp., 6 x 9, 281 illus., $8.50.

Blakiston Division — McGraw-Hill Book Co.
330 W. 42nd St., New York 36, N.Y. 201 Tamal Vista Dr., Corte Madera, Calif.

You may send me on 10-day approval:

Author_____ Title_____

Name_____ Address_____

City_____ Zone____ State_____

JADA 1/61

Call

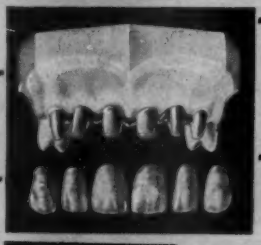
KIDA LABORATORY

for

- PORCELAIN JACKET CROWN

FOR Faithful color blending and anatomical reproductions

- PORCELAIN COPING BRIDGE



TO Assure amazingly natural simulations of healthy living teeth

BY Master ceramist's in their respective field

- ACRYLIC VENEER CROWN

AT FRED KIDA Laboratory for skilled craftsmanship and quality

- ACRYLIC ACRYPONTIC BRIDGE

SPECIALISTS IN PORCELAIN, ACRYLIC, GOLD

All restorations processed by KIDA Trained Ceramists and Technicians

FRED KIDA— ADA
Please send me—
- ☐ Literature and price list on your services.
- ☐ Your mailing boxes and prescription pads.
- ☐ Your prepaid postage labels.

Dr..... D.D.S.
Address.....
City.....
Zone.....
State.....

PERSONALIZED RESTORATIONS EXCLUSIVELY

136 East 57th Street, New York 22, N.Y.
● Plaza 3-1286-7-8

FRED KIDA

EST. SINCE 1918

be secure

use...

Pulpdent® ROWER

(Brand of Calcium Hydroxide Suspension)

LIQUID

CLINICALLY PROVEN*
CALCIUM HYDROXIDE
CAVITY LINER

Virtually eliminates pulpal irritation associated with cementation. Minimizes thermal shock. Aids in the formation of secondary dentin over exposed pulp. Dries rapidly, yet allows ample time for necessary manipulation. Adheres firmly to dentin. Especially useful under silicate cements, and under inlays, crowns and bridges.

Stocked by recognized dental supply houses.

*For further information, write to

ROWER DENTAL MFG. CORP.
Boston 16, Mass., U.S.A.

DE·NICOTEA

by dunhill

see it happen

THIS DISPOSABLE FILTER KEEPS TAR STAINS OFF TEETH

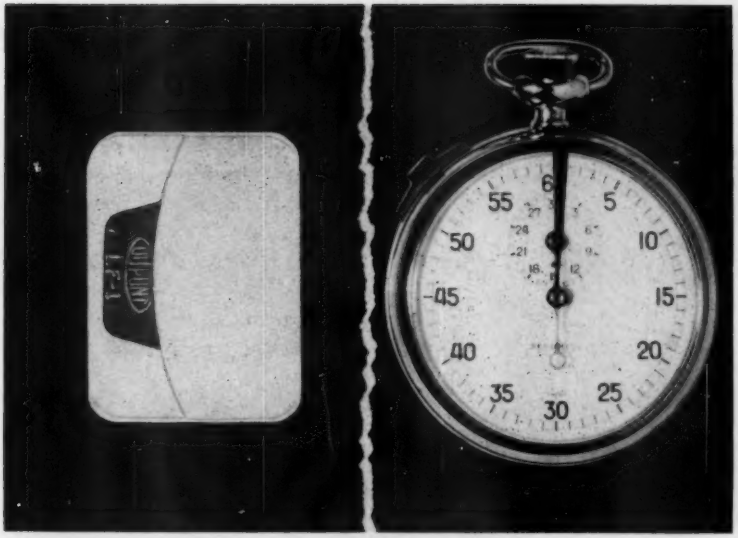
A single DeNicotea filter will remove 26% of the tars and 36% of the nicotine from the smoke from a pack of regular cigarettes . . . With filter tip smokes, it will further reduce tar intake by 32% and nicotine by one third . . . If these facts are important you should try a DeNicotea cigarette holder with your next pack. Many dentists do — and recommend DeNicotea to their smoker patients.

Special professional offer

Write today for lab report which confirms the above claims. And send 1.00 to the address below for a De-Nicotea ejector type holder and 10 filter refills. (regular price, 2.50) Specify men's or ladies' type.

DE-NICOTEA CRYSTAL FILTER CIGARETTE HOLDER

Alfred Dunhill of London, 393 Fifth Ave., N.Y.



LIGHTNING FAST...for speed, safety, savings

Just a second—that's the longest exposure you'll have to make with Du Pont's "LF" Dental X-Ray Film. The five-fold speed increase means less radiation for the operator and patient, sharper pictures, far less effect from patient motion. You'll be able to use low-distortion long-cone technique with normal exposure times, too.

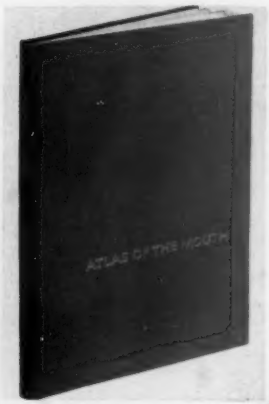
There's a complete line of Du Pont Dental X-Ray Films to help you get every diagnostic value from your equipment and skill. And to help you get the most from these films, we've prepared a simple, easily read technique chart. We'd be happy to send you one—or any other technical information you'd like—for a postcard to: E. I. du Pont de Nemours & Co. (Inc.), Photo Products Dept., Wilmington 98, Delaware.

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

YOUR PATIENTS DESERVE AN EXPLANATION

and here are two excellent books to help you



ATLAS OF THE MOUTH

The most cooperative patient is an informed one, and the ideal way to illustrate various oral conditions to patients in your office is with an *Atlas of the Mouth*. 67 large sized plates, drawn by a top medical illustrator, vividly depict normal and diseased structures. Eighteen of the plates show common clinical conditions and their treatment. A concise and scientific text accompanies each plate making the *Atlas of the Mouth* an ideal visual teaching text for dental assistants, hygienists and students. $5.00

TEETH, HEALTH AND APPEARANCE

For the reception room. Simply written, more than 100 illustrations. The perfect way to acquaint your patients with the importance of dental care. $3.50

Special Offer—Both Books for $7.75

AMERICAN DENTAL ASSOCIATION
Order Department, 222 East Superior Street
Chicago 11, Illinois

Please send me the following: my remittance is enclosed:

- ☐ P2 Atlas of the Mouth ($5.00)
- ☐ S6 Teeth, Health and Appearance ($3.50)
- ☐ Both for $7.75

Name_____

Address_____

City_____ Zone_____ State_____

580

added dimension

Ceramco 1800* is a self-glazing porcelain with such high density and translucency it is considered one of the most esthetic of all dental ceramic materials.

In combination with Aderer's Ceramco No. 1 Casting Gold a new dimension in porcelain-fused-to-gold restorations results.

Aderer-Ceramco bridges combine the best features of porcelain—esthetics, impervious to mouth fluids, kind to the tissues—with the strength, fit and durability you have always enjoyed in Aderer Bridge Golds.

Aderer Research, pioneers in the porcelain-baked-to-gold field, adds dimension to Ceramco 1800—a superior porcelain made better with Aderer-Ceramco No. 1 Gold.

CERAMCO No. 1 GOLD

Melting Range	2160°F-2240°F
Tensile Strength	51,000
Yield Strength	33,000
Brinell Hardness	150

Above values were determined from cast specimens treated in a furnace as in the porcelain application.

Write for Technical Bulletins and schedule of classes in Ceramco Porcelain-fused-to-Gold Crown and Bridgework.

ADERER GOLDS

JULIUS ADERER, INC.

NEW YORK • CHICAGO

*Ceramco 1800 is manufactured by CERAMCO, INC. • WOODSIDE 77, N. Y.

New Light on One of Dentistry's Common Problems—

THE SWEET TOOTH

"Low sugar diets are commonly used for caries control".[1] But maintaining a low sugar diet has always been difficult, especially for children with a thirst for soft drinks.

Fizzies are a great help. These satisfyingly sweet soft drink tablets contain no sugar whatsoever. Sweetening comes from Sucaryl® and Saccharin.

You just drop a Fizzies tablet in a glass of cold water for an instant, sparkling drink. Seven delicious flavors: Cola, Root Beer, Grape, Cherry, Orange, Lemon-Lime and Hula Punch (a mixed fruit flavor).

Recommend Fizzies to caries-prone patients. A product of Warner-Lambert Products Division.

[1]"Oral Hygiene" by Russell W. Bunting Lea & Febiger 1957 p. 150

FIZZIES...THE TABLET THAT MAKES AN INSTANT, SPARKLING DRINK

"TO SEE BETTER"®

you need the oral

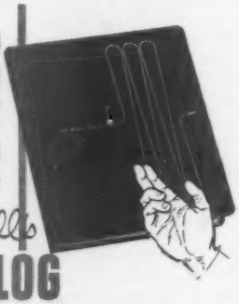
3-D MAGNI-FOCUSER

Constant focusing on your patient's mouth, especially when new hi-speed equipment is used can mean tired, strained eyes at the end of the day. MAGNI-FOCUSER magnifies the field of operation, relieves eyestrain, and gives true 3-D perception of depth. Leaves both hands free to work. Worn with or without regular eyeglasses. Normal vision resumed by raising head slightly. Weighs only 3 ounces. Precision ground optical glass. Order from your dealer or send $10.50 for 10-day trial. Money refunded if not fully satisfied.

EDROY PRODUCTS CO.

Dept. 16 480 Lexington Ave., New York 17, N.Y.

GOOD RECORDS are the KEY to successful Practice Management



Colwell's

DAILY LOG

THE DAILY LOG serves as a well qualified "business manager" in your office — the simplest of any professional system. Only a few minutes a day required to keep complete business records; helps you avoid tax troubles; saves you time and money. Fully dated; looseleaf; printed new each year.

PRICE: $7.75 for CALENDAR YEAR
Satisfaction guaranteed.

ORDER DIRECT OR WRITE FOR FREE INFORMATION KIT

THE COLWELL COMPANY
262 Kenyon Road, Champaign, Illinois

DIFFERENT BECAUSE . . .

Detergent in Action *Delightful in Taste*

GREEN MINT®

AT THE CHAIR . . . Green Mint's differentness makes it so "cooperative"—helps all procedures go a little smoother, easier, more pleasantly. *Detergent* action Green Mint cuts ropy saliva, flushes oral debris without tissue constriction common to astringent rinses. Perfect for pre-impression use. And a cool rinse of Green Mint postoperatively often comforts the patient.

AT HOME . . . the refreshing flavor of Green Mint restores a pleasant taste to the mouth at any time in the day.

This pleasant, non-medicated flavor contains no sugar. Its effective deodorant action is safe . . . no irritation to tender tissues even in the presence of tissue abrasion . . . a distinct advantage over astringent or "antiseptic" mouthwashes.

Use cooling, refreshing Green Mint in your office . . . suggest it to your patients for daily home use . . . they will welcome its pleasant taste and deodorant action.

USE THIS COUPON TO ORDER

SPECIAL PROFESSIONAL OFFER
1 gallon bottle postpaid only $2.50

BLOCK DRUG COMPANY, INC.
105 Academy Street • Jersey City 2, New Jersey

Please send me _____ gallon(s) Green Mint at $2.50 per gallon.

☐ Check enclosed ☐ Charge me

Name_____

Address_____

City_____ Zone_____ State_____

2

Index to advertisements—January 1961

Aderer, Inc., Julius....221
American Cancer Society, The....3rd Cover
American Dental Association
Accepted Dental Remedies—1961....170
Bureau of Dental Health Education....220
Dental Abstracts....212
Dental Directory—1961....190
Institute on Hospital Dental Service...214
Regional Conference on Hospital Dental Service....174
Relief Fund....182
Amurol Products Co....177
Astra Pharmaceutical Products, Inc..193, 194

Bard-Parker Company, Inc....215
Birtcher Corporation, The....191
Block Drug Company, Inc....13, 192, 223
Bosworth Company, Harry J....172
Bowen & Company, Inc....185
Bristol-Myers Company....226
Buffalo Dental Mfg. Corp....200

Caulk Company, The L. D....184, 213
Ceramco....225
Church & Dwight Co., Inc....165
Classified Advertising...200, 201, 202, 203, 204, 205
Coe Laboratories, Inc....12
Columbia Dentoform Corp....178
Colwell Company, The....222
Crescent Dental Mfg. Co....5

Dentists' Supply Co. of N. Y., The....14
Dunhill of London, Alfred....218
Du Pont De Nemours & Co., (Inc.) E. I..219

Eastman Kodak Company....196, 197
Edroy Products Co....222
Engelhard Industries, Inc....176
Exakta Camera Company....168

Fairfield Press, The....205
Fluoritab Corporation....203
Fund for Dental Education, The....206

General Electric Co....159
Gesner, Inc., M. A....198
Getz Corporation, The William....186
Great-West Life Assurance Company, The. 8

Hygienic Dental Mfg. Co., The....161

Industrial Credit Company....178
International Pharmaceutical Corporation....163

Jelenko & Co., Inc., J. F....1
Johnson & Johnson....187, 210

Kerr Manufacturing Company....171
Kida, Fred....217
Kumfort-Tyme Co....204

Lea & Febiger....178
Lorvic Corporation, The....157

McGraw-Hill Book Company....216
McShirley Products....168
Midwest Dental Mfg. Company....188, 189

Ney Company, The J. M....211
Nu-dent Porcelain Studio, Inc....4th Cover

Oral B Company....167

Pfingst & Company, Inc....201, 209
Procter & Gamble....4
Professional Budget Plan....169
Professional Printing Company, Inc....202
Pro-Forms, Inc....205

Rinn Corporation....7
Ritter Company Inc....183, 208, 209
Rower Dental Mfg. Corp....218

Saunders Company, W. B....166
Schneider Dental Laboratory, M. W....204
Siemens-New York, Incorporated....179
Squibb & Sons, E. R....180, 181
Stim-U-Dents, Inc....195
Surgident, Ltd....168
Swissedent....6

Union Broach Co., Inc....203

Vick Chemical Co....199
Vivadent Corp....9

Warner-Lambert Pharmaceutical Co....222
Weber Dental Manufacturing Company, The....2, 3
Whaledent, Inc....215
Wheat Flour Institute....175
White Dental Manufacturing Co., The S. S....10, 11
Whitehall Laboratories....155
Wyeth Laboratories....207

X-Ray Mfg. Corp. of America....173

who ever heard of breaking a bathtub?

Practically all bathtubs are made of porcelain; since porcelain is so brittle and friable, why don't bathtubs ever break?

Bathtubs are not really made of porcelain. Actually, they are cast iron with a thin layer of porcelain baked to the metal; and this provides the strength that makes bathtubs practically unbreakable.

The principle of Ceramco bridgework is the same; a thin layer of Ceramco porcelain is fused or baked to a solid framework of gold to impart to the bridge all the strength and fit inherent in the Ceramco gold alloy.

Ceramco bridges are *not* porcelain bridges . . . they are *gold* bridges with a thin covering of Ceramco porcelain for maximum esthetics to provide the strongest, most natural restorations available.

CERAMCO

CERAMCO
34-35 56th St., Woodside 77, N. Y.

☐ Please send list of Labs in my area who process Ceramco Restorations.

☐ Please send FREE Literature on Ceramco Restorations.

Dr._____

Address_____

City_____ Zone____ State____

For dental salicylate therapy:

BUFFERIN®
GIVES
FAST PAIN RELIEF[1, 2]
AND CURBS
SALICYLATE
INTOLERANCE[3]

When you give BUFFERIN to patients before or after treatment, analgesic and anti-inflammatory benefits are not likely to be marred by the discomforts of aspirin irritation of the stomach.

The *antacid* analgesia of BUFFERIN sharply reduces the incidence of gastric intolerance while enhancing the patient's comfort.

Salicylate blood levels may be sustained in the post-treatment period by continuing the standard dosage of BUFFERIN.

Bufferin® contains acetylsalicylic acid 5 grs. and DI-ALMINATE® (aluminum dihydroxyaminoacetate ¾ gr. and magnesium carbonate 1½ grs.).

Accepted COUNCIL ON DENTAL THERAPEUTICS AMERICAN DENTAL ASSOCIATION

1. Sleight, P.: The Lancet, p. 305, Feb. 6, 1960
2. Paul, W.D.: Dryer, R.L., and Routh, J.L.: J. Am. Pharm. Assn. (Scient. Ed.) 39:21 (Jan.) 1950.
3. Tebrock, H.E.: Ind. Med. & Surg. *20:* 480-482, 1951

Write today for your free supply of BUFFERIN in handy 2-tablet dispensing packs.

Bristol-Myers Company, 630 Fifth Avenue, New York 20, New York

THE AMERICAN CANCER SOCIETY

is dedicated to saving lives from cancer and spearheads the fight against cancer quackery. Its Committee on New or Unproved Methods of Treatment of Cancer has a membership of physicians, lawyers, educators, and public relations specialists. This committee has been a prime mover in developing constructive action

against cancer quackery

Inspired by model legislation formulated by this committee with the active cooperation of the California Medical Association, California, Kentucky and Nevada recently passed bills providing the first effective means of fighting cancer quackery at its base of operations—in the local community.

To keep both the public and the medical profession informed, the Society has established, in its national office, a central repository of material on new or unproved methods of cancer diagnosis, treatment and cure—a principal source of such information in this country.

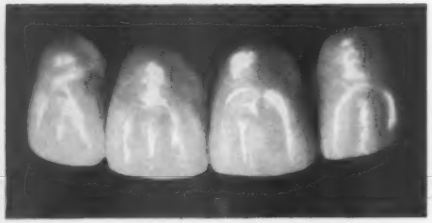
The American Cancer Society, in this as in all its efforts, serves both the private citizen and the practicing physician—and is, in turn, served by both.

THE AMERICAN CANCER SOCIETY

World Famous Statue of David by Michaelangelo in Florence, Italy

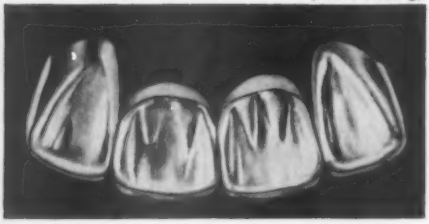
NU-DENT

VACUUM-BAKED



ACRYLIC RESTORATIONS

(Pat. Pending)



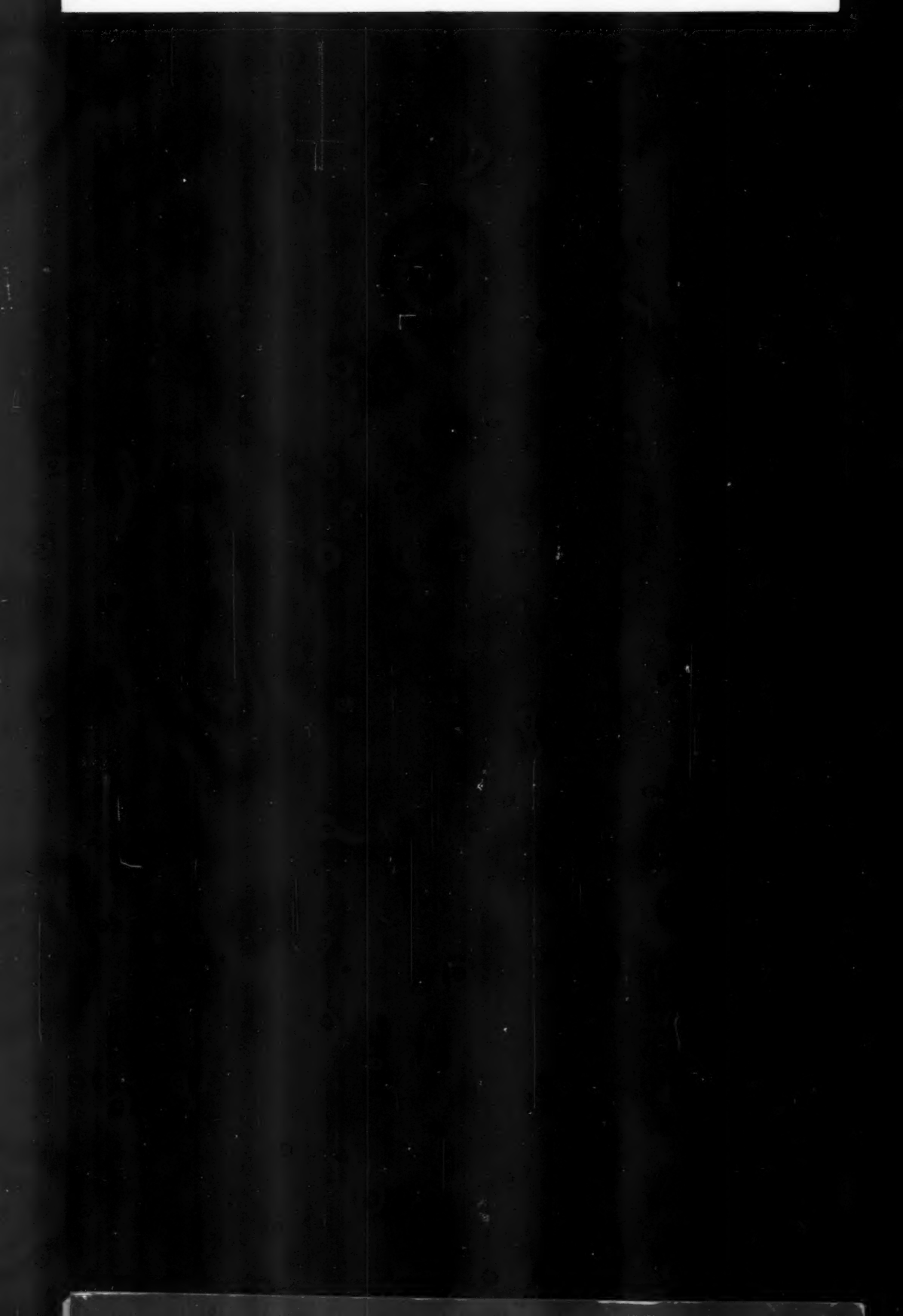
Continuous creative research has raised NU-DENT to its present position of pre-eminence amongst ceramic studios!

Latest achievement is an exclusive NU-DENT technique — ACRYLIC Restorations *Vacuum Baked* at 550° plus a wonderfully effective porcelain-like enamel opaquing material — EXELON.

The Baked Acrylic, Exelon opaque and gold casting become one solid bond... *creating acrylic veneers of exquisite beauty... much more resistant to abrasion.*

Write to the NU-DENT studio nearest you for detailed information on more beautiful, stronger acrylic veneers and other practice-building NU-DENT restorations.

nu-dent Porcelain Studio, Inc.

220 West 42 St., N.Y. 36, N.Y. • Phone—LA 4-3591, 2, 3, 4, 5, 6

9615 Brighton Way, Beverly Hills, Cal., Phone—CRestview 5-0717